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TROPICAL DISEASES BULLETIN

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BUREAU OF HYGIENE AND TROPICAL DISEASES

TROPICAL DISEASES BULLETIN.

Vol. 38.] 1941. [No. 9.

SUMMARY OF RECENT ABSTRACTS.*

VII. HELMINTHIASIS.

[*continued from p.* 430.]

Cestodes.

BARNETT (p. 211) discusses errors in teaching and in practice with regard to hydatid disease; the remarks cannot be further abstracted, but he points out that the slowness of growth and generally good behaviour of most cysts is not sufficiently recognized. He (p. 586) discusses hydatid disease in man, sheep and cattle in New Zealand. More than half of the beasts in the country are infected by the time they reach adult life. In public and private hospitals during 1938 there were treated 144 human cases.

In Iraq, SENEKJI and BEATTIE (p. 587) report an incidence of hydatid disease in 0·313 per cent. of hospital patients, of 11·93 in sheep and goats, and of 24·66 in cattle. Adult worms were found in 17·83 per cent. of street dogs. In Santiago de Chili, NEGHME RODRÍGUEZ (p. 587) reports an incidence of 21·18 per cent. of *E. granulosus* in homeless dogs. *Dipylidium caninum* was found in 56·06 per cent. In the United States the wolf forms a reservoir host of *Echinococcus granulosus;* of the wild animals RILEY (p. 587) reports that the moose is frequently infected with cysts.

LAWSON (p. 212) reports a case in which there was a hydatid cyst of the liver, which almost obliterated that organ, and which was estimated to have been present for 56 years. On pages 589 and 590 are reports by various authors of hydatid cysts of the pancreas, kidney, ilio-psoas muscle, the epiphyses of the knee joint and of the neck.

IVANISSEVICH (p. 587) lays down the general lines of treatment of hydatid cysts of the lungs; surgical treatment should be early and complete, and to ensure this, diagnosis must be made early. X-ray should be used on all children and on all patients who consult a doctor in endemic areas, and in this way small cysts can be detected and treatment instituted when it will be effective. He discusses the conditions which may be found at operation. ITURRASPE (p. 588)

* The information from which this series of summaries has been compiled is given in the abstracts made by the Sectional Editors in the *Tropical Diseases Bulletin*, 1940, Vol. 37. References to the abstracts are given under the names of the authors quoted and the pages on which the abstracts are printed.

discusses the radiological appearances and the treatment of hydatid cyst of the lung in which part of the parasitic membrane is retained after expulsion of the contents. CHIFFLET (p. 589) discusses the surgical treatment of multiple hydatid cysts of the peritoneum.

MENON and VELIATH (p. 591) have studied the nature of the tissue reaction around cysticerci in man, which leads to absorption of the parasite and formation of fibrous tissue, the multiple scars thus formed in the brain being held to be the main pathological basis of the nervous symptoms. Calcification of cerebral cysts is not common.

In infection with *Taenia saginata*, TÖTTERMAN (p. 215) found marked eosinophilia in marrow and blood, but erythropoiesis was not influenced.

MAPLESTONE and MUKERJI (p. 213) report on the treatment of 12 cases of infection with *Hymenolepis nana* with gentian violet in doses of one grain three times a day for varying periods. They conclude that the drug is probably valuable, but that much more work is necessary before the optimum method of giving it can be laid down.

VERSIANI and RENAULT (p. 214) report a case of human infection with *Hymenolepis diminuta* in S. America; treatment with oil of chenopodium was apparently successful.

DOLLFUS (p. 214) gives the names of five species of Raillietina found in man in Ecuador.

TÖTTERMAN (p. 215) discusses anaemia and erythropoiesis on the basis of blood and sternal marrow examination in infections with *Diphyllobothrium latum*. In those cases in which the colour index was low there was no improvement after elimination of the worms, and in many of these there was bile pigment in the urine, suggesting liver damage. If the anaemia was of the pernicious type it improved rapidly on unworming.

VON BONSDORFF (p. 215) states that aqueous extracts of *D. latum*, *T. saginata* and *Ascaris lumbricoides* exercise a marked inhibiting influence on the proteolytic activity of normal human gastric juice if the reaction is approximately neutral, but have no such action on trypsin, papain and pepsin, or on gastric juice at strong acid reaction. The worm proteins are quickly digested by trypsin, papain and pepsin, but not by gastric juice at *p*H 7·4. He (p. 216) shows that in certain experiments a liver preparation which was exposed to the action of *D. latum* and other worms, and to extracts of them, did not lose its anti-anaemic effect.

JOYEUX *et al.* (p. 216) state that ocular sparganosis is becoming more common in the Tonking delta. All cases are due to the native habit of using frogs, either eviscerated or chopped and in the form of compresses, to the eye. The sparganum may settle in the lid or the orbital fat or may burrow towards the face. The lid is at first inflamed and at this stage removal of the parasite is difficult; later, when encapsulation has taken place, removal is relatively easy. The histology resembles that of syphilis and the authors refer to the success of novarsenobillon in treatment.

Nematodes.

Ankylostomiasis, Ascaris infection, etc.—DESCHIENS (p. 217) discusses the action of certain fungi, which prey on free-living nematode larvae, in relation to the possibility that such fungi may be useful against the nematode parasites of man. To be successful the fungi must be

available in sufficient quantity, must grow on the land in sufficient quantity and must be harmless to man, beast and vegetation. The best fungi for this purpose are *Arthrobotrys oligospora, Dactylella bembicodes,* and *D. ellipsospora,* which grow well on or below the surface; they appear to be harmless to vegetable and animal life, but only experience can determine if this is true.

In Colombo WIJERAMA (p. 218) found hookworm eggs in 52 per cent. of hospital patients; the infection rate in city dwellers was 23·2 per cent., in those from out-stations 69·9, and the average egg counts were heavier in the country dwellers than in the city dwellers. There was a general relationship between the number of eggs passed and the degree of anaemia, and there was evidence that ankylostomiasis predisposed to other illnesses. CHIAROTTI (p. 217) reports a focus of hookworm infection at Novara, between Milan and Turin; most of the patients showed clinical evidence of the infection though only a few were anaemic. All houses possess latrines and cesspits, but defaecation in the market gardens is common, and the people work in these gardens either barefoot or shod only in clogs.

ZAINAL *et al.* (p. 592) have found, in hookworm oedema, a decrease in total plasma protein and in plasma albumin, with an increase in the globulin. The albumin : globulin ratio was usually less than 1, which is a reversal of the normal. They consider that the oedema is due to the reduction of the colloid osmotic pressure due to the decrease in albumin, and that this lack of albumin may be the result of lack of protein in the diet or of deficient absorption from the bowel.

For the treatment of hookworm infection SMILLIE (p. 219) recommends four drugs in order of election: hexylresorcinol, tetrachlorethylene, carbon tetrachloride and oil of chenopodium. HADDAD (p. 594) gives details of the results obtained from the use of a number of drugs in the treatment of hookworm and other helminthic infections in the Congo.

AZMY PASHA and ZANATY (p. 218) found that whereas small transfusions of blood in hookworm anaemia had only slight and temporary haematinic value before the administration of iron, they produced a further rise of haemoglobin and red cells if they were given after the conclusion of a course of iron therapy. The bone marrow in hookworm anaemia is hyperplastic, erythropoiesis being dominant. The authors consider the aetiology of hookworm anaemia and idiopathic hypochromic anaemia to be essentially due to chronic bleeding, and small blood transfusions may therefore be useful, after iron therapy, in the treatment of the latter condition. OTTO and LANDSBERG (p. 593) show that the addition of iron to a generally deficient diet will not prevent the onset of fatal anaemia in dogs infected with hookworm [nor could it be expected to do so. In comment LANE quotes from his own writings in which he explains modern views on haemopoiesis. For the change from megaloblast to erythroblast the extrinsic factor, contained in protein food, is necessary; iron is needed at a later stage for the transition from erythroblast to erythrocyte.]

MCKENZIE (p. 219) found that the administration of vitamin B_1 rapidly cured the oedema in two cases of hookworm anaemia after iron therapy combined with a generous diet had failed to do so. He suggests that the oedema is due to loss of vitamins in the blood extracted from the host by the hookworms. HOFF and SHABY (p. 592) report three cases of subacute combined degeneration of the cord

caused by severe secondary anaemia due to infestation with *Ancylostoma duodenale* and successfully treated with iron, liver extract and vitamin B_1.

VAN LOOKEREN CAMPAGNE (p. 219) records four fatal cases of poisoning by oil of chenopodium; in none had the drug been taken on medical prescription, and he advocates that it should only be obtainable at chemists' shops. CAVALLERO (p. 595) gives the results of a study of the pathological conditions induced in the liver of white rats by acute and chronic poisoning with carbon tetrachloride administered by inhalation, and of the effect of injection of colchicine on this poisoning. The action of colchicine is to increase mitosis.

HARE (p. 596) reports on the results, so far observed, of providing bored hole latrines in coolie lines of an estate in Assam. Taking other lines, which have no latrines of this kind, as controls, the results of stool surveys show that some improvement in both percentage and weight of infection has been achieved, but it is evident that infection is still taking place, probably in the fields and houses. The latrines are a great success and the larvae in the fields and houses will probably gradually die out.

OTTO (p. 593) states that experiments appear to demonstrate that the serum of dogs actively immunized by repeated infection with *A. caninum* contains an antibody of considerable potency against the hookworm larvae. Specific acquired immunity seems to play an active rôle in canine infection and it is necessary to take this into account in the study of human disease.

SANDGROUND (p. 219) describes the intense irritation he experienced after becoming infected with larvae of *Ancylostoma brasiliense* and a species of Strongyloides. These persisted for 55 days, and in excised skin the larvae were found in the corium 1·5 mm. from the surface. In Batavia the slightly moist sand with which European children play is a suitable medium for *A. brasiliense* larvae, and cats select such sand for defaecation.

GALLIARD (p. 650) has investigated infection with Strongyloides in Tonking. Natural infections of dogs and cats are rarely reported, yet these animals are readily infected by larvae from human sources; whether this is due to lack of exposure or to lack of investigation is not known. In dogs infected from man, both the direct and indirect cycles of development occur at first, but as passage succeeds passage through dogs only the indirect cycle persists, in which a free-living adult stage becomes necessary. These facts point to the identity of the canine and human forms.

BONNE and LIE KIAN JOE (p. 220) record the finding of Trichostrongylus in scrapings of the duodenum of 10 of 40 Javanese; the species was probably *T. colubriformis*, but a second species was also probably present. HEYDON and BEARUP (p. 220) report a case of infection with *Trichostrongylus colubriformis* in a child in New South Wales.

SCOTT (p. 647) shows that in Egypt infection with *Ascaris lumbricoides* is present in 20 per cent. of the rural population, but in the delta it is as high as 80 per cent. In both, however, the average number of worms per person is lower than that recorded in any other endemic area; the infection is evenly spread in the villages and is not confined, as is usual in regions of low prevalence, to a few families. Infection is transmitted, nevertheless, primarily by direct hand to mouth transfer of eggs which have developed on the moist floors, and thus women and children are more infected than men. MOMMA *et al.*

(p. 648) report somewhat unfavourably on hexyl-resorcinol in the treatment of Ascaris infections; ill effects were common and the cure rates not high.

AUGUSTINE (p. 297) found no morphological differences between Ascaris recovered from the chimpanzee *Pan troglodytes* and *Ascaris lumbricoides* from man. In experiments on *Macaca mulatta* it was found that this monkey was not susceptible to infection with Ascaris from man or pig.

Filariasis.—DASSANAYAKE (p. 302) quotes figures of the incidence of filariasis due to *W. malayi* in two areas of Ceylon. In both the incidence was at one time high and in both there had been at that time a plentiful growth of *Pistia stratiotes*. This plant has in the meantime disappeared and the present rate of infection is very low. TOUMANOFF *et al.* (p. 651) have found *Mf. bancrofti* in as many as 11·16 per cent. of prisoners in middle Tonking, and *Mf. malayi* in as many as 6·72 per cent. in upper Tonking. *A. minimus* and *A. jeyporiensis* have both been found infected with *Mf. malayi*, and both are strongly anthropophilic in habit in the regions concerned. In school-children in the Okinawa prefecture, OHAMA (p. 300) found an average rate of infection with *Wuchereria bancrofti* of 14·8 per cent. In the majority of cases the infection was light, but the degree of infection rises gradually with advancing age. YOKOGAWA and YUMOTO (p. 650) found microfilariae in 28·47 per cent. of night bloods examined in the island of Isigaki. YOKOGAWA *et al.* (p. 651) have found that, contrary to expectation, infection with *W. bancrofti* is present in the Pescadores; infection rates, in night blood, ranged from 0·85 to 11·22 per cent. of children; most of the infections were light. *Culex fatigans* is prevalent.

KOBAYASI (p. 651) gives details of a study of the morphology of *Mf. bancrofti*. IYENGAR (p. 652) discusses the differentiation of the microfilariae of *W. bancrofti* and *W. malayi*, adding a note on the nomenclature of the latter. In comment LANE also discusses nomenclature, and the more recent description of the adult by RAO and MAPLESTONE [this *Bulletin*, 1941, Vol. 38, p. 152] places this matter on a proper footing.

YOKOGAWA (p. 652) has experimented with mature larvae of *W. bancrofti* dissected from mosquitoes and placed on the skin of mice, and with larvae set free from the proboscis of the mosquito. In the latter case some of the larvae entered the puncture caused by the bite, but rarely penetrated if one or two layers of the skin were left intact. After entering the skin through the bite they migrated along lymphatic spaces and also indiscriminately in the tissues. In man the author thinks that larvae may become adult and produce microfilariae 20 to 30 days after infection, but LANE asks the pertinent question whether, in the author's experiments, the human subjects chosen had ever lived in an endemic area.

BASU and RAO (p. 301) have studied the development and transmission of *W. bancrofti* in *Culex fatigans*. The physical conditions at which larvae best reach infectivity lie between 70° and 90°F. and 70 to 100 per cent. relative humidity. The highest infection and infectivity rates are found when the larvae in the blood imbibed number 101 to 150 in 0·2 cc., the lowest rates were recorded when the larvae numbered between 301 and 600. The highest percentages of infectivity were seen when the mosquitoes fed on patients aged between 51 and 60. In a comment it is indicated that the tables on which these conclusions are based need rearrangement.

PRAWIROHARDJO (p. 304) gives a list of good vectors of *Mf. bancrofti* in Batavia, and also of those mosquitoes which are of no importance in this respect. The conclusions were reached on the results of dissections of the mosquitoes after they had bitten the same patient, who had *Mf. bancrofti* in his blood.

HODGKIN (p. 302) shows that the different species of Mansonia have preferences in the water plants to which the larvae attach themselves. *M. annulifera* prefers the roots of *Pistia stratiotes*, *M. uniformis* prefers *Eichornia crassipes*, the water hyacinth, but also breeds where swamp grass is found. *M. longipalpis* larvae are found attached to the roots of certain swamp-loving trees ; this mosquito only exceptionally breeds with the species whose breeding places are known, and it is the most important vector of *Mf. malayi* in Malaya. It follows, therefore, that the South Indian control measure of clearing *Pistia stratiotes* will not be effective in control of filariasis in Malaya ; there appears to be no alternative to drainage. BONNE-WEPSTER and BRUG (p. 303) observe that *M. uniformis* uses a considerable number of water plants as hosts ; if only *Pistia stratiotes* is present the majority of the larvae may be found, not in its roots, but in the water or mud at the bottom. BONNE-WEPSTER (p. 303) reports that *M. longipalpis* and *M. crassipes* have been bred in conjunction with water plants of the genus Ipomoea.

GORDON and LUMSDEN (p. 653) have made a careful study of the behaviour of the mouth parts of mosquitoes when taking up blood from living tissue. The mosquito was *Aedēs aegypti* and the experiments were made on the frog *Rana sphenocephala* infected with *Foleyella dolichoptera*, the microfilariae of which are present in the circulating blood ; the process was observed under the microscope as the proboscis entered the web of the foot of the frog. On entering the skin there is an active and purposive bending of the distal fifth of the labrum by means of which the tip may enter a capillary, though this entry may be accidental, for the fascicle may pass through a capillary. Feeding may take place direct from a capillary, in which case it is a rapid process, or from a pool of blood collecting in the tissues from a ruptured capillary, in which case it is relatively slow ; throughout the process saliva is probably injected into the tissues. It has previously been shown that the numbers of microfilariae taken up by different mosquitoes feeding on the same host at the same time may vary widely and that the numbers found in the stomachs of the mosquitoes after capillary feeding are greater than those found after pool feeding. The explanation of these facts may be that in the capillaries the microfilariae are not evenly distributed, and that microfilariae escape into the tissues less readily than red cells from a ruptured capillary. In comment LANE offers another explanation of the concentration of microfilariae in the stomach of Aēdes, namely that the mosquito after feeding soon passes blood per rectum, and microfilariae pass less readily than cells through the gut of the insect, and are therefore relatively concentrated in the stomach.

KNOTT (p. 304) holds that in cases in which microfilariae are found in the night blood they may also be found in the day blood if enough is examined, and gives in detail his method of using the sediment from 1 cc. of venous blood, laked with formalin and stained as a thick film. By this method microfilariae were found in the day blood in 57 of 66 positive cases, whereas by using only 20 cmm. the microfilariae were seen in 20 only. GALLIARD and NGUYEN HUU PHIEM (p. 305)

point out that the numbers of *Mf. malayi* found in the blood at different periods of the day and the total over the whole 24 hours vary widely from day to day.

KNOTT (p. 655) describes the pathology of filariasis of the testicle, which is a result of lymph stasis due to sterile lymphangitis in the vessels occluded by dead worms, and the clinical findings which may be observed. Hydrocele is the disorder which most commonly brings the patient to the physician, and the author, in giving directions for treatment, observes that filariasis of the testicle is always bilateral and that therefore, if operation is indicated, both testicles and both inguinal rings should be exposed, preferably through a transverse suprapubic incision.

CHOPRA and RAO (p. 656) have tested a large number of drugs for their influence on filarial infection (presumably due to *W. bancrofti*). Of these Fouadin gave the most satisfactory results, causing disappearance of the circulating microfilariae which was, however, only temporary. It succeeded in controlling the inflammation and fever for a comparatively long time, and this result was also obtained with Soamin, but this drug failed to bring about any appreciable diminution in the numbers of circulating microfilariae. BROWN and AUSTIN (p. 657) show that Stibsol, a trivalent antimony compound, is effective in sterilizing the blood of dogs infected with *Dirofilaria immitis*. Several animals which died were found to have dead adult worms in the heart and it seems probable that the effect of the drug is to kill the adults. In the heart of the dog this may lead to clot formation and death of the animal, but as LANE points out in comment, this risk would not be present in man if the drug were to be tried in infections with *W. bancrofti*.

BRUYNOGHE (p. 657) discusses Lane's theory that microfilarial periodicity is due to daily birth and daily destruction of larvae. He reports experiments which show that the infection of rabbits with *Dirofilaria immitis*, and of guineapigs with the embryos of this worm, does not produce antibody or sensitize the skin to injection of antigen prepared from the adult worm. In *Loa loa* infections, however, the Dirofilaria antigen was effective in producing reactions. Antigen reactions therefore vary with the host and perhaps with the parasite.

Though filarial infection has not previously been reported from Bolivia, MORALES (p. 656) reports the finding of the sheathless *Mf. demarquayi* in the day and night blood of five patients there.

HAWKING (p. 306) has investigated onchocerciasis in Kenya. In persons from the Kakamega district microfilariae were found in 62 per cent. of a group with eye lesions or nodules, and in 38 per cent. of a group of hospital patients taken at random as controls. Eye lesions, however, occurred in 34 per cent. of those who showed microfilariae and in 23 per cent. of those who did not, so that the association is doubtful. Nodules were present in 16 per cent. of those with microfilariae. Eosinophilia is not a useful diagnostic sign. MIRA (p. 658) reports the presence of *Simulium damnosum* in parts of Abyssinia adjacent to Kenya [and the unexpected finding of onchocerciasis in Kenya would make it desirable to investigate the possibility of its occurrence here also].

DUBOIS and VITALE (p. 306) have found *Mf. streptocerca* in the Belgian Congo, and state that it is associated with elephantiasis, but the fact that the microfilariae are found in the skin in elephantiasis may be a result of the lymph stasis rather than the cause of the condition.

GREIG (p. 658) reports *L. loa* infections of long standing, in which there was no interference with general health. X-ray examinations revealed coiled shadows in the tissues of one arm, which were probably those of calcified *L. loa*.

LINDBERG (p. 659) shows that of the species of Cyclops found in tanks in the Deccan, only *Mesocyclops vermifer* was infected with *Dracunculus medinensis*, and that no more than one embryo was found in any one infected Mesocyclops. *M. vermifer* is by far the commonest species found. He (p. 659) gives a list of fish found in tanks in the Deccan, some of which feed on Cyclops.

Enterobius infection, Trichiniasis, etc.—CRAM and NOLAN (p. 300) found 55 per cent. of the children in a private nursery day school in Washington to be infected with Enterobius. Control measures led to a diminution in the incidence, and these consisted of non-medicated enemata, the use of lysol for water closets, wash basins and floors, the sunning of cots and blankets and careful hand washing after defaecation and before meals.

BRADY and WRIGHT (p. 299) have studied the symptomatology of Enterobius infection; they note that after treatment many infested children show gain in weight, improvement in colour, disappearance of dark circles under the eyes and improvement in appetite. Enuresis is not more common than in non-infested children, but vaginitis is more frequent than was previously thought; restlessness and insomnia occur, but there is no evidence that the infection causes nervous irritability. There is probably slight eosinophilia.

BOTSFORD *et al.* (p. 648) discuss the association of *Enterobius vermicularis* with appendicitis, noting that 22 patients who had the infection but in whom there was no histological evidence of appendicitis presented a syndrome exactly like that of acute appendicitis. Differentiation is therefore not possible and the safest measure is appendicectomy. On the other hand SCHWARZ and STRAUB (p. 649) state that *E. vermicularis* regularly causes characteristic lesions of the mucosa of the appendix, and may cause abscess. They regard this worm as an important primary cause of appendicitis and consider that a campaign against it would be of social importance.

WRIGHT and BRADY (p. 649) report favourably on gentian violet in the treatment of threadworm infection, quoting the results obtained in 224 cases and measured by tests with the NIH swab. Details of dosage are given. Previously WRIGHT and his colleagues (p. 649) had reported on santonin, hexylresorcinol in enemata or by the mouth, and non-medicated enemata. MINDLIN and URRIBARRI (p. 300) describe an enema of ether with liquid paraffin and olive oil for the treatment of threadworm infections.

In the *Journal of the American Medical Association* (p. 659) it is stated that in necropsy surveys in the United States about 18 per cent. of diaphragms examined have been found to contain larvae of Trichinella, but illness was not always caused, so that the incidence of clinical trichiniasis is not a true index of the extent of infection. SAWITZ (p. 308) found infection with *Trichinella spiralis* in 6 per cent. of 400 autopsies in New Orleans. Although the diaphragm contains more embryos than the pectoral muscles, it is estimated that surveys in which the diaphragm only is examined would miss 13 per cent. of cases. There were no histories of clinical symptoms of trichiniasis in any of the 24 human cases studied. Infection was found in 10 per

cent. of cats in the city and the incidence in cats is regarded as an indication of the endemicity of the infection.

FAILMEZGER and SPALDING (p. 308) found Trichinella larvae in the blood of three children of one family; 10 cc. were withdrawn, mixed with 25 cc. of a 2 per cent. solution of acetic acid, and centrifuged; the sediment was stained and examined. Eosinophilia was marked during the 12 days following the first examination, reaching 30, 41 and 51 per cent. respectively. EVERS (p. 309) reports the recovery of Trichinella larvae from the cerebrospinal fluid of a patient who had symptoms suggesting toxic encephalitis and neuro-retinitis. Larvae from the cerebrospinal fluid have been reported in 24 cases, but are not always associated with clinical manifestations; careful examination of the fluid may be an aid in diagnosis.

ROTH (p. 660) finds that one small infection with Trichinella in guineapigs offers some measure of immunity against subsequent reinfection; this is apparently due to an intestinal defensive mechanism, which restricts the numbers of adults which develop there, and shortens their lives.

LICHTERMAN and KLEEMAN (p. 660) employed an extract of Trichinella larvae for skin tests in pigs which had been fed on uncooked garbage; the results, compared with post mortem findings, showed an error of less than 3 per cent.

MCNAUGHT *et al.* (p. 309) report that the continuous use of phenothiazine in rats reduced the severity of infection by 74 per cent. and warrants further experimentation.

SWARTZWELDER (p. 660) gives a description of the symptoms associated with infection with *Trichuris trichiura* in the absence of other intestinal parasites. MAPLESTONE and MUKERJI (p. 661) report that the forms of iron in common use for the treatment of certain types of anaemia are of no use in removing Trichuris. They therefore cannot confirm the work of VAZQUEZ PAUZA [this *Bulletin*, 1938, Vol. 35, p. 380]. In their work they found that the Stoll technique was not so efficient as D.C.F.

SKRJABIN (p. 662) from Moscow reports a case of human infection with *Thominx aerophilus*, a member of the family Trichocephalidae and normally a parasite of the respiratory system of carnivorous animals. Eggs were present in the patient's sputum and the symptoms were those of severe tracheo-bronchitis.

MAPLESTONE and SUNDAR RAO (p. 307) record the removal of a second gnathostome from a man in whom the first specimen had been found 10 years before and in whom the whole history had lasted 17 years. It is not probable that reinfection had taken place, so that the worm had persisted for 17 years and had undergone no change during the last 10, since the two extracted specimens were identical. DAENGSVANG (p. 307) reports the finding of an immature female *Gnathostoma spinigerum* in a tumour in the great omentum of a Siamese woman.

Charles Wilcocks.

RABIES.

A Review of Recent Articles. XXXV.*

i. *Virus.*

Kligler and Bernkopf[1] furnish further information regarding the characters of culture virus [see this *Bulletin*, 1939, Vol. 36, p. 724, and other papers]. A requisite for successful culture is embryo brain (mouse and rat embryo brain are equally suitable). Adult brains are unsuitable. Human or monkey serum seems to be essential for growth. In such suitable media the authors have grown the virus in 250 cc. flasks, with 25 cc. of medium per flask, with the same ease as in the case of other viruses. "Successful implantation on the developing chick embryo is possible only if 5 to 6 day embryos are employed. When such embryos are inoculated the virus seems to find its way to the brain where it continues to multiply until the embryo is about 2 weeks old. Thereafter the concentration of the virus diminishes and ultimately disappears." The authors have now carried out 20 serial passages in the chick embryo over a period of 7 months. Culture virus rapidly loses its ability to infect mice by the intraperitoneal route, though there is no loss of virulence when injected intracerebrally. Embryo brain virus appears to be more virulent than allantois virus. Both active and formalinized culture virus vaccines proved potent antigens. Culture virus appeared to be a much better antigen than chick embryo virus.

A thorough study of the characters of the virus—designated as the Moscow 2 strain by Vichelessky and his co-workers and placed by them in the group of neurotropic agents causing encephalomyelitis in horses—has been made by Howitt[2]. The particle size, 80 to 130 millimicrons, places this virus closer to rabies than to the American strains of equine encephalomyelitis, 20–30 millimicrons. "From the serological and immunological reactions, from the difficulty of filtration, from the particle size, from the absence of the virus in the blood and organs, from the ability to infect dogs both intracerebrally and subcutaneously, and from the presence of intracytoplasmic inclusions, although slightly atypical and not inclusive for all animals, the Moscow 2 virus may now be classified with the rabies strains rather than with the American viruses of equine encephalomyelitis as has formerly been suggested."

ii. *Symptoms.*

A case of human rabies is described by Palmer[3].

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* For the thirty-fourth of this series see this *Bulletin*, Vol. 38, p. 159.

[1] Kligler (I. J.) & Bernkopf (Hans). Studies on the Cultivation and Antigenic Characters of Rabies Virus.—*Amer. Jl. Hyg.* 1941. Jan. Vol. 33. No. 1. Sect. B. pp. 1–8.

[2] Howitt (Beatrice). Relationship of Moscow 2 Virus of Equine Encephalomyelitis to Rabies.—*Proc. Soc. Experim. Biol. & Med.* 1941. Jan. Vol. 46. No. 1. pp. 69–73. [11 refs.]

[3] Palmer (P. F.). A Log of Human Rabies.—*Jl. Roy. Army Med. Corps.* 1941. Apr. Vol. 76. No. 4. pp. 229–232. With 1 fig.

iii. *Pathology.*

PALAWANDOW[4] reports 30 cases of shock amongst 2,725 persons inoculated in 1937 with Fermi's Vaccine. He has carried out a number of experiments in an endeavour to arrive at an explanation of this phenomenon. Inoculation directly into the blood stream of rabbits was found to be toxic and in high doses fatal. The presence of phenol increased the toxicity. Emulsions of dried cords were more toxic than those of fresh material. Filtration removed toxicity. Post-mortem examination revealed the presence of multiple thrombi in lungs, brain and other organs.

Of four rabbits immunized by GRIASNOW and SUSLOWA[5] with PHILIPP's vaccine, and subsequently inoculated subdurally with fixed virus, three remained healthy. The brains of these survivors, killed fifteen days after the infection, were washed, through the carotid, with physiological saline, and an emulsion of equal parts of these brains, and of the brains of the rabbits which had succumbed to rabies was prepared, and allowed to stand for 48 hours. This emulsion (1 in 1,000) was inoculated intracerebrally into other rabbits, all of which died of rabies after 4 to 5 days. "The brains of the immunized rabbits thus contained no rabicidal antibodies."

iv. *Methods of Treatment, and Statistics.*

WEBSTER[6] gives a brief summary of the work in which he and other American workers have been engaged during the last 5 years. This had its origin in the mouse diagnostic test devised by WEBSTER and DAWSON, and some 18 communications have appeared which deal with the various applications of the mouse technique. These have been reviewed individually in this *Bulletin*. The ground covered has been the examination of commercial vaccines, and attempts to improve them; the characteristics of culture and allantoic vaccines; attempts at concentration; the use of chloroformized vaccines; irradiation of the vaccine, etc. The American workers are to be congratulated upon the thoroughness of their investigations, and on the setting up of a method which can be used as a standard, and which should bring the future work of investigators in the various laboratories into line.

A series of experiments has been carried out by HABEL[7], with a view to finding what factors influence the titre of the animal brains supplying the virus, and thus to obtain a vaccine in which the virus content will be as great as possible. He suggests that the passage dose should be 0·2 to 0·25 cc. of a 1 in 1,000 dilution of the supernatant of the previous passage brain, and that higher concentrations give less favourable results; (the evidence for this suggestion is unconvincing);

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[4] PALAWANDOW (G.). Ueber die Toxizität der Hirnemulsion bei intravenöser Einführung.—*Jl. Microbiol., Epidémiol. et Immunobiol.* Moscow. 1940. No. 8. [In Russian pp. 73–77. German summary.]

[5] GRIASNOW (N.) & SUSLOWA (M.). Rabizide Antikörper und die Unempfänglichkeit bei Tollwutschutzimpfungen.—*Jl. Microbiol., Epidémiol. et Immunobiol.* Moscow. 1940. No. 8. [In Russian pp. 71–72. (18 refs.) German summary.]

[6] WEBSTER (Leslie T.). Antirabic Vaccination—Present Status.—*Amer. Jl. Public Health.* 1941. Jan. Vol. 31. No. 1. pp. 57–59. [18 refs.]

[7] HABEL (Karl). Factors influencing the Efficacy of Phenolized Rabies Vaccines. II. Virus Content of Vaccine.—*Public Health Rep.* 1941. Mar. 28. Vol. 56. No. 13. pp. 641–649. [13 refs.]

that the rabbit should be killed after it has been completely paralysed for 1 or 2 days: that the method of killing is immaterial; and that the brain may be kept for a short period of time in 50 per cent. glycerine preferably at —10°C. or lower.

Using culture virus which had been irradiated [this *Bulletin*, 1941, Vol. 38, p. 161], HODES, WEBSTER, and LAVIN found that for mice, 1 cc., containing 50,000 mouse intracerebral doses, was necessary to give good protection. Beagle dogs weighing about 500 times as much as a mouse, required 500 times the mouse dose, or 500 cc. As this volume was impracticable, attempts were made to raise the titre in the tissue culture, but without success. A tenfold concentration of culture virus was however obtained (without loss of immunizing potency) by freezing and drying procedures. As this concentrated vaccine would need to be given to dogs in doses as large as 50 cc., recourse was had to infected mouse brain as a source of virus. WEBSTER and CASALS[8] report that this virus is fatal in 10^{-7} dilution, and that if a 1 per cent. suspension is centrifuged, the supernatant is lightly opalescent and can be rendered non-virulent by exposure to ultra-violet light for less than 30 minutes. This material in a single injection of 0·1 cc. (containing before irradiation 50,000 doses), immunizes mice adequately. It was then tested in dogs with the following results. Eight beagle dogs weighing about 300 times as much as the mice were given intraperitoneally a single dose of 30 cc. of non-virulent irradiated vaccine; eight were given 10 cc. three times at weekly intervals; eight received 6 cc. of commercial chloroformized 20 per cent. vaccine, and eight were left unvaccinated as controls. After 4 weeks an infecting dose of 0·25 cc. of a 5 per cent. street virus was given to each dog in the muscles of the neck of each side. All the controls died of rabies, 4 of the 6 treated with chloroformized vaccine died similarly, whilst of those treated with the irradiated vaccine none died.

KASAHARA and SHA-SHI-NAN[9] have examined the immunizing properties of vaccine which has been submitted to ultra-violet light. A 10 per cent. emulsion of passage virus was filtered and centrifuged. The supernatant fluid was subjected to the rays for 15–20 minutes. This vaccine was injected in doses of 0·5 cc. intraspinally 5 times during 5–7 days. Five days after the last injection, 3 rabbits received a test dose of 0·05 cc., 5 a test dose of 0·1 cc., and 5 a dose of 0·25 cc. of a 10 per cent. emulsion of virulent virus injected intraspinally. All the animals remained alive and well.

LEACH and JOHNSON[10, 11] have extended the investigation described in the last review [this *Bulletin*, 1941, Vol. 38, p. 164]. The whole series of experiments may be summarized as follows:

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[8] WEBSTER (Leslie T.) & CASALS (J.). An Irradiated Non-Virulent Anti-Rabies Vaccine.—*Science.* 1940. Dec. 27. Vol. 92. No. 2400. pp. 610–611. With 1 fig.

[9] KASAHARA (Michio) & SHA-SHI-NAN. Ueber die Schutzwirkung des mit Ultraschallwellen behandelten Lyssavirus.—*Klin. Woch.* 1940. Aug. 24. Vol. 19. No. 34. p. 866.

[10] LEACH (Charles N.) & JOHNSON (Harald N.). Canine Rabies Vaccination. An Experimental Study of the Efficacy of the Single Subcutaneous Injection Method with Chloroform-treated Vaccine.—*Amer. Jl. Hyg.* 1940. Nov. Vol. 32. No. 3. Sect. B. pp. 74–79.

[11] JOHNSON (Harald N.) & LEACH (Charles N.). Canine Rabies Vaccination. An Experimental Study of the Efficacy of the Single Intraperitoneal Injection Method with Phenol-treated Vaccine.—*Amer. Jl. Hyg.* 1940. Nov. Vol. 32. No. 3. Sect. B. pp. 69–73.

	Vaccinated			Controls		
	Total dogs	Died of rabies	Percentage	Total dogs	Died of rabies	Percentage
1. Commercial phenol-treated vaccine given in a single subcutaneous injection of 5 cc.	105	26	24·8	120	66	55·0
2. The same but given intraperitoneally ...	52	19	36·5	63	34	54·0
3. Commercial chloroform-treated vaccine in single subcutaneous dose of 5 cc. ...	50	2	4·0	55	34	61·8

The chloroform treated vaccine was prepared according to the method of KELSER. [See this *Bulletin*, 1931, Vol. 28, p. 747, and SCHOENING *ibid*, 1930, Vol. 27, p. 754.] Thus "the chloroform-treated vaccine produced a significantly higher degree of protection than the phenol vaccine when the same amount of vaccine was administered, and when the test inoculation was given one month after vaccination."

Antirabic treatment in Palestine[12] has now been completely decentralized. Of 1,894 persons who received treatment during 1939, 4 died of rabies, all within 15 days after completion of treatment. No neuroparalytic accidents occurred.

v. *Paralytic Accidents.*

HERRON[13] discusses the incidence, aetiology, symptoms, pathology, and prognosis of paralytic accidents following antirabic treatment, and describes a fatal case of the Landry type.

vi. *Rabies in Animals.*

A short summary of our knowledge regarding rabies in the tortoise, the hedgehog, the bat, and the mongoose is given by GREVAL and NICHOLAS[14]. One of the authors (GREVAL) has previously suggested that "rabies smoulders in forests and flares in human habitations." "It is now suggested that it may occur even in the lower animals, which may not be much inconvenienced by it."

A. G. McKendrick.

[12] PALESTINE: DEPARTMENT OF HEALTH. ANNUAL REPORT FOR THE YEAR 1939 [HERON (G. W.), Director of Medical Services]. Section viii. Laboratory Services [STUART (G.), Deputy-Director (Labs.)]. pp. 99–102, 110–112 & map facing p. 92.—Anti-Rabies (Pasteur) Institute.

[13] HERRON (Paul H.). Fatal Paralysis following Antirabic Treatment.—*New Orleans Med. & Surg. Jl.* 1941. Mar. Vol. 93. No. 9. pp. 446–450. [11 refs.]

[14] GREVAL (S. D. S.) & NICHOLAS (M. J.). Rabies in Lowlier Animals.—*Indian Med. Gaz.* 1940. Dec. Vol. 75. No. 12. pp. 739–740.

VAN STOCKUM (Maria J. Otten). Rabies-onderzoekingen. [**Rabies Investigations.**]—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1941. May 13. Vol. 81. No. 19. pp. 1002–1073. With 1 graph. [18 refs.]

The long and patient experimental work on rabies of Mrs. M. J. Otten-van Stockum is very well known. It is sad to hear that such highly specialized investigation has come to an untimely end. Dr. Otten presents the case for Dutch readers of the results so far obtained and also the views regarding their statistical analysis which were originally given in an English work, "New Principles of Antirabic Treatment and Rabies Statistics" [this *Bulletin*, 1935, Vol. 32, pp. 612–616]. Such views are necessarily controversial, but it may suffice here to give the conclusions which are now reached after a further period of trial and experiment. These are :—

1. The mortality from rabies among the untreated is of no value for the estimation of the effect of the treatment.
2. Apart from the number of the treated, it is the distribution of the cases according to the incubation time which gives a satisfactory appreciation of the effect of treatment. Account must, of course, be taken of the interval between bite and beginning of treatment.
3. By application of this fully reliable statistical test it would appear that all known methods of treatment are failures. Only the use of monkey fixed virus, whether living or killed by formalin, leads to satisfactory results.
4. This finds its confirmation in the animal experimentation, provided that definite controls are taken into account.
5. An experimental research over many years demonstrated that the effectiveness of a fixed-vaccine virus is dependent on the species of animal from which the vaccine is prepared as well as on the type and concentration of the rabicidal reagent used.
6. By the use of 10 per cent. suspension of monkey brain and formalin in 1·5 per thousand concentration, after exposure to a temperature of 37°C. for 5 days a fixed vaccine virus of superior activity is obtained, for both animal experiment and the treatment of human beings.

W. F. Harvey.

MALARIA.

Précis of Abstracts in this Section.

WIGGLESWORTH (p. 500) discusses biological research in relation to malaria and war.

FIELD and LE FLEMING (p. 501) describe the morphology of *Plasmodium malariae* in thick blood films, and FIELD (p. 501) discusses the differential diagnosis of the three common parasites.

On the China-Burma highway ROBERTSON (p. 501) reports that in the low-lying plains subtertian malaria is the most prevalent form, but that benign tertian is dominant at high altitudes. *A. minimus* is almost certainly the chief vector, and it is where this is abundant that subtertian malaria is prevalent. WILLIAMS (p. 502) also discusses malaria on this highway. The commonest form is subtertian. Control measures are mentioned, and if applied in town and labour camps should solve the problems which have most hindered the construction and use of the road.

BATES (p. 502) gives details of his method of rearing *Anopheles maculipennis*, with particular reference to combinations of salts used in the water. KEKHCHER (p. 503) discusses the behaviour of *Anopheles maculipennis* in the Province of Moscow, giving his reasons for believing that most mosquitoes are infected from latent or relapsed cases in June. Workmen are attacked while in the peat bogs, but since the introduction of aircraft for dusting Paris green the mosquito population of these bogs has been considerably reduced. Control of mosquitoes alone, however, is not regarded as sufficient to eliminate malaria, but should be supplemented by medical treatment of the whole population in spring.

WHITE (p. 504) shows that although *A. culicifacies* is an important vector in the Trans-Indus and upper Ganges areas, it is not an effective vector in the north and south Gangetic plains. No satisfactory explanation of this anomaly is forthcoming and there are no reasons to suppose that two races of the mosquito exist. He (p. 505) reports that neither the type nor the *mysorensis* form of *A. stephensi* has been found infected in Calcutta; both are attracted to cattle rather than to man.

THOROUGHMAN (p. 505) shows that in Soochow attacks of malaria frequently follow blood transfusion even when parasites cannot be found in the blood of either donor or recipient. In a small series such attacks did not occur if the recipients were given prophylactic quinine after transfusion. The attacks may be due to parasites in the transfused blood, or to activation of latent malaria in the recipients [but no mention is made of the freshness or length of preservation of the transfused blood].

ARMENTANO and BENTSÁTH (p. 506) describe two cases in which chronic splenomegaly was revealed as due to malaria by the finding of parasites in red cells obtained by sternal puncture although there were no parasites to be found in the peripheral blood. The authors claim to have seen both pigmented and non-pigmented forms in the sternal cells; in comment WENYON remarks on the anomaly of this assertion.

Recording results with the Henry test, ASAI (p. 507) states that though of value in acute and chronic stages, it cannot be relied upon as an indicator of cure. OU (p. 507) presents the results of the Takata reaction in malaria.

FAWCITT and WALTERS (p. 508) obtained a strikingly good response with intravenous reconstituted serum in a patient gravely ill with subtertian malaria which had not responded to quinine and atebrin.

In the *Annals of Tropical Medicine and Parasitology* (p. 508) it is stated that biological tests confirm the findings in chemical tests, that the British pamaquin is identical with plasmoquine.

WATSON (p. 509) states that in oil all substances which are toxic to mosquito larvae are soluble in water and capable of penetrating the cuticle. The heart is very susceptible to these substances, which are also capable of killing the micro-organisms in water. The entry of oil is due to efforts to clean the spiracles, and it is drawn along the tracheae as a result of absorption of oxygen by the tissues.

STAROSTIN (p. 509) shows that the dusts which make the best vehicles for Paris green for use in aircraft are those which are least compressible, and which do not therefore form lumps, and those which are least hygroscopic. Road dust containing river or desert sand is good since

the particles are polished and rounded and do not clog. LAZUK (p. 510) discusses the dusting of Paris green from aircraft in Western Russia, showing that for large peat bogs it is economical and effective.

POGODINA and SOKOLOV (p. 510) discuss the production of aerosols or mists from anabasine, which are very lethal to mosquitoes inside buildings. Details of technique are given. In the *Science News Letter* (p. 511) is a reference to the attempts made to control the spread of *Anopheles gambiae* in Brazil by larvicides and fumigation of transport facilities.

CLARK *et al.* (p. 511) report on the tenth year of malaria control in Panama by means of drug treatment of all infected persons. Drug control alone cannot prevent epidemic outbreaks if Anopheles are numerous, but severe clinical malaria may be almost eliminated, with the result that labour efficiency is increased. MOOIJ (p. 512) describes the measures of malaria prevention taken in the Royal Netherlands Indies Army.

By single parasite infections COULSTON and MANWELL (p. 512) have shown that pigmented forms of *P. circumflexum* can give rise to pigment-free forms, but only after long delay, which suggests that pigment-free forms only develop when the defensive mechanism of the host is severely taxed. MANWELL (p. 513) records a similar finding with *P. relictum* var. *matutinum*. PORTER and HUFF (p. 513) review the question of exoerythrocytic schizogony, concluding that although these schizonts may be developed from sporozoites, they may also arise from erythrocytic forms. Bodies resembling these schizonts have been seen in monkey and human malaria (benign and subtertian). *C. W.*

WIGGLESWORTH (V. B.). **Malaria in War.**—*Nature.* 1941. Apr. 12. Vol. 147. No. 3728. pp. 436–439.

The object of this paper is to illustrate the ways in which pure biological research can help the practical man. The author first gives certain figures which demonstrate the importance of malaria in influencing military operations in the Mediterranean countries and in Africa during the war of 1914–18. He then briefly refers to the known vectors in those regions, discussing the question of the races of *Anopheles maculipennis* at some length.

In the Army the general plan has been to establish mobile malaria laboratories, with malariologists and entomologists who will undertake investigations and advise on the problems raised. In prevention under war-time conditions the use of mosquito nets and of insecticidal sprays should be encouraged wherever these measures can be applied. The principles of the control of breeding are mentioned—alteration of salinity, flushing, oiling and the dusting of Paris green. The qualities of oils used, and the need for further investigation, are discussed, and the author finally refers to the importance of a close study of mosquito habits, illustrating his remarks by quoting the recent work on *A. minimus* conducted in Assam by R. C. Muirhead THOMSON [see this *Bulletin*, 1941, Vol. 38, p. 335].

The paper summarizes the subject in a clear and authoritative manner; it may with advantage be read in conjunction with that of CHRISTOPHERS, abstracted in this *Bulletin*, 1940, Vol. 37, p. 174.

C. W.

FIELD (J. W.) & LE FLEMING (H.). **The Morphology of Malarial Parasites in Thick Blood Films. Part III.** *Plasmodium malariae.*—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1941. Jan. 31. Vol. 34. No. 4. pp. 297–304. With 1 fig. & 4 plates (2 coloured).

This, the third paper of the series dealing with the morphology of malarial parasites in thick blood films, describes the appearance of *Plasmodium malariae*. As is the case with the previous papers [this *Bulletin*, 1940, Vol. 37, pp. 56, 739] the description has to be followed carefully with the black and white and coloured drawings and micro-photographs. With the help of these papers and a certain amount of practical experience the identification of the species of the parasites seen in thick films should be a relatively easy matter.

C. M. Wenyon.

FIELD (J. W.). **The Morphology of Malarial Parasites in Thick Blood Films. Part IV. The Identification of Species and Phase.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1941. May 27. Vol. 34. No. 6. pp. 405–414. With 15 figs. on 5 plates.

In this paper, the fourth of the series dealing with the morphology of malarial parasites in thick films, the author considers the differential diagnosis of the three common species. He discusses young non-pigmented trophozoites, older trophozoites with commencing pigmentation, schizonts, gametocytes and mixed infections. There are five plates of illustrations which, with their detailed descriptions, should enable anyone to become proficient in the identification of malarial parasites by the methods the author employs. *C. M. W.*

ROBERTSON (R. Cecil). **A Malaria Survey on the China-Burma Highway.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1941. Jan. 31. Vol. 34. No. 4. pp. 311–332. With 2 maps & 10 figs. on 4 plates.

This report is an amplification of a previous publication [see this *Bulletin* 1940, Vol. 37, p. 792]. It contains an interesting account of the genesis of the China-Burma Highway, of the topography of the country through which it passes, and of the great engineering difficulties surmounted in its construction and upkeep. Attempts to obtain information regarding the intensity of local endemic malaria were hampered by language difficulties and the fact that the Shan people and native tribesmen resent anything in the way of systematic medical examination. The paper is concerned chiefly with the western portion of the highway between the Salween River and the Burma frontier: it is this portion of the road which passes through country in which malaria prevalence is highest.

In the low-lying plains subtertian malaria is most prevalent: at high altitudes benign tertian is most in evidence. Quartan infections were rare except in one town. Seventeen species of Anopheles were collected at different places visited in Yunnan. *A. jamesi* and *A. tesselatus* are reported from this province for the first time. *A. hyrcanus* var. *sinensis* is the most prevalent species: though infected specimens were found the author does not consider it to be one of the most important vectors. *A. minimus* is almost certainly the chief vector: where this species is abundant subtertian malaria is prevalent.

Norman White.

WILLIAMS (L. L.), Jr. **Malaria on the China Burma Highway.**—*Amer. Jl. Trop. Med.* 1941. Jan. Vol. 21. No. 1. pp. 1–11. With 1 chart.

This is a presidential address; it contains an interesting, though necessarily brief, account of the activities of a commission that was sent by the United States to co-operate with the Chinese National Health Administration. The task of the Commission was to determine the nature of epidemics along the China-Burma Highway, to suggest methods for their control, and to train a group of Chinese doctors in such methods.

A brief description is given of the Highway from Kunming, the capital of Yunnan, to the Burma border, a distance of 625 miles. The only epidemic disease of importance was found to be malaria. Along the eastern end of the road malaria is not very prevalent; along the western end malaria is hyperendemic. South-west Yunnan has always had an unenviable reputation as the home of a deadly disease, changch'i, which is malignant tertian malaria. The indigenous population in southwest Yunnan is not Chinese. In the valleys, between 2,000 and 5,000 feet, Shans predominate: here malaria is very rife. Other aboriginal tribes, notably the Katchins and Lolos, inhabit higher altitudes where malaria is all but absent. The highest spleen and parasite rates were found in Chefang, and here the headquarters and laboratory were installed. The spleen rate of 237 children in Chefang was 60·8 and the parasite rate 52·3 per cent.: these were midwinter rates. All the enlarged spleens were hard and extended varying distances from the midpoint between the umbilicus and costal margin, to the umbilicus. Of the parasites found 30 per cent. were *P. vivax*, 67 per cent. *P. falciparum*, and in 3 per cent. there were mixed infections. Between December and May eleven species of Anopheles were identified. *A. hyrcanus* var. *sinensis* was most prevalent; *A. minimus* came next in order of density. *A. minimus* is the principal, if not the only, vector. Control measures included subsoil drainage with sections of local bamboo, larvicides (oil and Pyrethrum emulsion and Paris green), the propagation of shade bushes, and Gambusia. Such measures should secure adequate protection for labour camps and headquarter towns and thus solve the principal health problems which militated against the building of the road and which have slowed up the delivery of supplies.

N. W.

BATES (Marston). **Studies in the Technique of raising Anopheline Larvae.**—*Amer. Jl. Trop. Med.* 1941. Jan. Vol. 21. No. 1. pp. 103–122.

In a previous paper (Bates 1939) the author described the results obtained in rearing anopheline mosquitoes using various chemical media. The present paper describes results obtained when using a combination of mineral salts.

The absolute necessity for calcium in raising Anopheles larvae is stressed, but the pure calcium sulphate was found to be not so good as the commercial product. Commercial gypsum, used for making plaster, was found to be an excellent larval medium. Experiments showed sodium chloride in a dilution of one part per thousand to be

about the optimum, at least when rearing *A. maculipennis* var. *atroparvus*. Potassium nitrate was injurious, even in minute quantities, and chloride and phosphate appeared to be unnecessary.

As routine media, grass sods seemed to give the best results. The virtue of this method appeared to be in the mud; suspensions of the mud gave as good results as the sod itself. But the type of water and mud had some influence on larval growth. The good results obtained by using mud are attributed to the presence of mineral or organic food.

As an organic food for raising *Anopheles maculipennis* var. *atroparvus*, dried bread crumbs seemed to be the most satisfactory, especially so when the water contained 0·5 per thousand calcium sulphate, 0·5 sodium chloride and 1·0 magnesium sulphate and, apparently, an absence of potassium nitrate.

In this paper the author has described the varieties of *A. maculipennis* as though they were separate species. The effect of light on larval development is not mentioned.

There are nine tables in the paper showing the influence of various media on larval survival and development. The paper is divided into ten headings, which include Method; Standard media; Inorganic salts; Organic foods; Routine media (grass sods); Experiments with water and mud; Routine method of larval culture; and Comparison between species. There are also an introductory section and a summary.

[*A. maculipennis*, all varieties, develop readily in pans containing soft water to which have been added sods of earth. Not all will agree with the author that it is necessary to change the water two or three times during development, especially if the water is gently aerated for an hour or so each day, while the larvae are in the first and second instars. The importance of obtaining sods of earth some distance from tarred roads and fences may also be considerable. The addition of any organic foods will often be found to be quite unnecessary when larvae are reared in pans containing large sods of earth, and overcrowding is well tolerated.] *P. G. Shute.*

KEKHCHER (O. M.). Essais d'une liquidation d'un foyer paludien dans les exploitations de tourbe de Ozéretzkoie. [**Malaria Control in a Peat Bog in Ozeretzkoie.**]—*Med. Parasit. & Parasitic Dis.* Moscow. 1940. Vol. 9. No. 1–2. [In Russian pp. 12–38. With 5 graphs. French summary.] [Summarized in *Rev. Applied Entom.* Ser. B. 1941. Feb. Vol. 29. Pt. 2. pp. 22–23.]

"An intensive anti-malaria campaign was carried out in 1935 and 1936 in a peat-bog district in the Province of Moscow, where *Anopheles maculipennis*, Mg., was abundant, its breeding places, in order of decreasing importance, being temporary accumulations of water densely covered with vegetation and well exposed to the sun, lakes formed by disused turf-pits with an abundant growth of *Elodea canadensis* and low sloping banks overgrown with sedge, recently cut turf-pits only sparsely covered with vegetation, and ditches. The incidence of malaria was also favoured by the scarcity of cattle (24 cows among a population of 1,500) and the bad condition of the workmen's huts, which were damp, dark and badly ventilated and

had cracks in the walls, so that the mosquitos readily penetrated to the interior and sheltered there during the day. Data given on the seasonal occurrence of *A. maculipennis* during the two years and the fact that malaria parasites were found in the peripheral blood most frequently in June indicate that the mosquitos of the first generation, which emerge in June, are epidemiologically the most important. From consideration of the effect of the local summer temperatures on the developmental cycle of the parasites in the mosquito and of the incubation period in man, it is concluded that fresh cases of malaria cannot occur before mid-July and can serve as sources of infection for the mosquito only in August, when most of the females have a developed fat-body and are inactive. It follows, therefore, that the chief sources of infection for the mosquito are latent cases and relapses. The author suggests that the parasite responsible is a strain of *Plasmodium vivax* that has a prolonged period of incubation and is most active in man in spring. Instances of infection with *P. falciparum* also occur, however, and malaria is endemic owing to the constant influx of workmen, many of whom are infected, from other parts of the Russian Union.

"Considerable protection was afforded by intensive screening of the workmen's huts and the use of mosquito nets. During 1935, relatively few mosquitos were taken in screened huts, and the majority had not fed, evidently because they had no access to the people under the nets. It appears that the mosquitos find suitable shelter and food in nature, as of several thousand that were stained and released in the peat-bog in 1936, only 10–15 were found in the huts on each of the three following days; it seems, therefore, that attacks on the workmen in the turf-pits are unavoidable. Systematic daily catches of mosquitos in houses, cowsheds and latrines caused a marked decrease in the percentage of older females, and dusting the breeding places from an aeroplane considerably reduced the mosquito population in the second half of the season. It was supplemented by spraying from the ground with a waste machine oil, which proved an effective larvicide, though the larvae remained alive under the film for 14–16 hours, or by dusting with a mixture of 1 part Paris green and 20 parts sifted peat.

"From these investigations, the author concludes that the control of mosquitos alone is insufficient to eliminate malaria in the locality. An intensive campaign against the disease in man is essential, and medical treatment of the entire population should be carried out in spring."

WHITE (R. Senior). **Studies on the Behaviour of Adult** *A. culicifacies*. **Part III. Dissection Records.**—*Jl. Malaria Inst. of India.* 1940. Sept. Vol. 3. Nos. 2 & 3. pp. 363–382. With 1 folding map.

The author discusses the importance of *Anopheles culicifacies* as a vector of malaria in different parts of India and Ceylon.

Until a few years ago it was assumed that *A. culicifacies* was a carrier in every area in which it is found. But in 1937 Senior White showed that though common in the Jeypore Hills, and though malaria was also common, this species was not infected.

In the present paper the author arranges a great number of records of dissections (73,000) from many parts of India, classifies them under

11 areas (for India) and sets them down on a map. Data from Ceylon are included. The results are striking. If one excludes dissections made in epidemics, one gets such results as :—

Area	Total dissected	Sporozoite rate per cent.
Trans-Indus	2,072	2·3
Indus—Upper Ganges ...	12,267	0·40
North Gangetic Plain ...	3,205	0·06
South Gangetic Plain ...	2,210	0·00

In the first of these areas the species is unquestionably a vector, and probably it is in the second (the low rate of infection being counterbalanced by the insect's abundance). In the third and fourth areas it is not an effective vector.

No satisfactory explanation is forthcoming, and detailed studies on the dimensions of eggs give no ground for thinking that two "races" exist : careful anatomical studies of all stages in the life cycle are called for. *P. A. Buxton.*

WHITE (R. Senior). *Anopheles stephensi* **in Calcutta.**—*Jl. Malaria Inst. of India.* 1940. Sept. Vol. 3. Nos. 2 & 3. pp. 349–361. [20 refs.]

"1. Both the type and the *mysorensis* form of *A. stephensi* are found in Calcutta. In recent years the type form has suddenly become very rare.

"2. The maxillary indices of the two forms differ, but the numbers examined do not permit it to be stated that the difference is significant.

"3. The fertility of the *mysorensis* form in captivity is very low.

"4. Both forms in Calcutta are attracted to cattle rather than to man. Neither form has been found infected on dissection. The daytime resting places remain obscure."

THOROUGHMAN (J. C.). **Malaria Transmission by Blood Transfusion.**—*Chinese Med, Jl.* 1940. Dec. Vol. 58. No. 6. pp. 682–686. [12 refs.]

In the hospital at Soochow, Kiangsu, China, 457 blood transfusions were given to 284 patients during a period of a year and a half. The donors were for the most part coolies. Malaria is endemic in Soochow. Although the blood of the donors was examined before transfusion the transmission of malaria infection by such transfusion appears to have been a common occurrence. From the statistical information produced it is not possible to determine the frequency of such transmission of malaria infection. It was not possible to exclude the possibility of latent malaria infection in the patients treated. One hundred and four patients gave no history of recent malaria : no parasites were found in their blood on admission to hospital. They received 176 blood transfusions. Forty-five of these 104 patients developed malaria within a period of 20 days following the transfusion. There were 25 *P. vivax* and 12 *P. falciparum* infections ; in 8 cases the species of

parasite was not determined. The attacks of malaria were readily controlled by quinine. There was no case among 34 patients who received prophylactic quinine for three days after transfusion.

N. W.

ARMENTANO (L.) & BENTSÁTH (A.). Die Bedeutung der Sternalpunktion bei der Differentialdiagnose der Splenomegalien. [**Value of Sternal Puncture in Differential Diagnosis of Splenomegaly.**]—*Klin. Woch.* 1940. Nov. 16. Vol. 19. No. 46. pp. 1189–1190.

In describing two cases of malaria in which the diagnosis was not established till parasites were revealed by sternal puncture, the authors outline recent developments in our knowledge of malarial plasmodia, particularly with regard to the existence of exoerythrocytic schizogony, which takes place in the internal organs and in most cases intervenes between the introduction into the body of sporozoites and the appearance of pigmented parasites in the red blood corpuscles. These exoerythrocytic forms, which are non-pigmented, occur in cells of the reticulo-endothelial system and have given rise to the conception of malaria as an infection not only of the red blood corpuscles but of the reticulo-endothelial system also.

One of the cases was that of a woman, 58 years of age, who was suffering considerable embarrassment from a greatly enlarged abdomen. This was found to be due to an enormous spleen which extended to the right iliac crest. The patient was kept under observation for some time. There was no fever, the blood changes were slight and repeated blood examinations failed to reveal malarial parasites even after provocative doses of adrenalin. The patient was again seen nine years later when she was found to be in much the same condition, apart from the fact that now rigors and fever occurred regularly every fourth day. Blood examinations carefully carried out by thin and thick films again failed to reveal any malarial parasites. Finally sternal puncture was performed and in smears of the material obtained *Plasmodium malariae* was found in fairly large numbers. Not only were pigmented parasites present, but also non-pigmented forms which are said to resemble those described by RAFFAELE in the bird malarial parasites, *P. elongatum* and *P. relictum*. As regards gametocytes, macrogametocytes alone were present. The patient was given atebrin treatment, which had no influence on the spleen. Accordingly, plasmoquine was administered in a dose of 2 cgm. twice a week. There was a rapid response, the spleen shrinking to half its size in three months and to a third in four. After a further four months the organ had returned to its normal size.

The second case was in a man 30 years of age who suffered from epigastric pain of such intensity that relief had to be given by morphia. There was some enlargement of the liver and spleen but no fever. Symptoms indicated involvement of the gall bladder, for which appropriate treatment was adopted. As the patient did not recover, sternal puncture was carried out, with the result that *Plasmodium vivax*, both pigmented and non-pigmented forms, was discovered. Treatment with atebrin and plasmoquine brought about complete recovery.

Discussing these cases, the authors ask why it was that the malarial parasites, which were always within red blood corpuscles, did not make

their way into the blood. They can only suggest that the explanation may be similar to that which accounts for the appearance in the peripheral blood of nucleated red blood corpuscles, myeloblasts and myelocytes only under certain pathological conditions. [The statement that the parasites seen in the two cases were always within red blood corpuscles and never in reticulo-endothelial cells is difficult to reconcile with the assertion that both pigmented and non-pigmented parasites were seen.] *C. M. W.*

ASAI (Masaaki). Zum Studium der Serodiagnostik der Malaria. I. Mitt. Ueber die Henrysche Reaktion, insbesondere vergleichendes Studium von Netzhautmelanin und Villain-Dupouxscher künstlichen Melanin als Reagenzien. [**On Henry's Reaction in the Diagnosis of Malaria.**]—*Taiwan Igakkai Zassi* (*Jl. Med. Assoc. Formosa*). 1940. Nov. Vol. 39. No. 11. [In Japanese pp. 1836–1848. [33 refs.] German summary pp. 1848–1849.]

In order to test the value of Henry's reaction in the diagnosis of malaria and the utility of the Villain and Dupoux artificial melanin the author carried out parallel experiments in 153 cases of malaria with both reagents. In the one case the melanin was obtained from the choroid of the eye of the buffalo and in the other the artificial melanin was prepared according to the formula of Villain and Dupoux. His results are shown in the following table:—

	Percentages of positives.		
	Choroid melanin	Artificial melanin	Alkaline water
Acute malaria	76·0	68·9	28·0
Latent malaria	44·4	53·7	13·3
Chronic malaria with enlarged spleen	85·7	100·0	71·4
Under treatment	60·0	66·7	—
After treatment	28·5	32·1	—

[The numbers of patients in the different groups are not given in the German summary.]

The precipitation in alkaline water was taken as the control. Since the percentages of the reaction with the artificial melanin, with the exception of the acute cases in which the percentage was somewhat lower, were, in general, higher than with the eye melanin, the author concludes that the artificial can replace the natural melanin. He considers that the test is of serological value in the acute and chronic stages of malaria. As, however, a few cases, which were negative after treatment, relapsed within two months, the reaction cannot be relied upon as an indicator of cure of the disease. *E. D. W. Greig.*

OU (Teishun). Ueber die Takata-Reaktion bei Malaria. [**Takata-Reaction in Malaria.**]—*Taiwan Igakkai Zassi* (*Jl. Med. Assoc. Formosa*). 1940. Nov. Vol. 39. No. 11. [In Japanese pp. 1825–1833. German summary pp. 1834–1835.]

The author investigated the problem in 116 cases of different forms of malaria in Formosa. The sample of blood is taken in the morning

when patient is fasting; this he considers important. He followed the method of Takata. The reaction was considered positive if flocculation occurred in three hours and in at least three tubes. In addition to flocculation he also paid attention to the occurrence of opacity after the addition of the Takata reagent. The results were: in 24 healthy persons and 20 primary acute malaria cases the reaction was quite negative, positive in 10 per cent. [presumably three] of 30 patients who had relapsed and who had been ill for one year, in 26·0 per cent. [presumably 13] of 50 old chronic cases with enlarged spleen and in 68·8 per cent. [presumably 11] of 16 old cases with enlarged spleen and liver. When opacity of the tubes was taken as an indicator the percentage of positive reactions was increased and even in the early acute cases positive reactions occurred; further, the opacity did not occur in cases of malaria which had been treated. A temporary flocculation frequently was noted when blood was taken after a meal. There was no parallel relationship between the Takata and Henry reactions in acute malaria, although they coincided in chronic cases. There appeared to be no connexion between the Takata reaction and liver damage. *E. D. W. Greig.*

FAWCITT (J.) & WALTERS (A. H.). **Acute Malignant Tertian Malaria: Treatment aided by Reconstituted Serum.** [Memoranda.]—*Brit. Med. Jl.* 1941. Jan. 4. p. 14.

An Indian seaman, aged 35, was very gravely ill with malignant tertian malaria contracted at Freetown. In spite of treatment with atebrin and quinine his condition gave rise to considerable anxiety. The intravenous administration of reconstituted serum by the drip method, 40 to 60 drops a minute, was followed by striking improvement in the man's condition. The authors suggest that reconstituted serum acts by diluting, and perhaps neutralizing, the circulating malaria toxin; it may also minimize the quinine shock that is sometimes sustained by toxically debilitated patients of this type.

N. W.

ANNALS OF TROPICAL MEDICINE AND PARASITOLOGY. 1940. Dec. 31. Vol. 34. Nos. 3 & 4. pp. 223–228. With 2 figs.—**A Comparison of the Biological Action of Plasmoquine Dihydrochloride (Bayer) and Pamaquin Dihydrochloride (I.C.I.).** [Miscellanea.]

Imperial Chemical Industries Limited have synthesized a substance, pamaquin, which is believed to be identical with plasmoquine (Bayer). Tests were carried out at the Liverpool School of Tropical Medicine to ascertain whether the biological effects of the two drugs were identical. These tests and their results are described. Toxicity tests were carried out in canaries, hens, mice and monkeys: the toxicity of the two drugs was similar. To compare their therapeutic action tests were made in infected canaries (*P. relictum*), fowls (*P. gallinaceum*), monkeys (*P. knowlesi*), and in man (*P. falciparum* and *P. malariae*). In each case strictly comparable results were obtained. The biological tests thus confirm the chemical view that plasmoquine (Bayer) and pamaquin (I.C.I.) are identical. *N. W.*

WATSON (G. I.). **A Physiological Study of Mosquito Larvae which were Treated with Anti-Malarial Oils.**—*Bull. Entom. Res.* 1941. Jan. Vol. 31. Pt. 4. pp. 319–330.

This paper has been "extracted from a thesis for the M. D. degree." It describes in detail the methods used by the author for observing the behaviour of single mosquito larvae in contact with oil and comparing the differences which occur with different oils. It is suggested that this procedure may be a useful one for arriving at efficient mixtures of anti-malarial oils. All the toxic substances in oils are said to be soluble in water and capable of penetrating the outer cuticle of the larva; the initial entry of oil is attributed to the efforts of the larva to clean the spiracles, and its passage along the tracheae to the removal of oxygen from the tracheal system in metabolism; larvae with a non-toxic oil in one trachea may moult and rid themselves of it; the heart is very susceptible to the water-soluble toxins in oils; oils which kill micro-organisms in the water are the same as those which poison mosquito larvae; the control of the spiracular flaps is attributed to a "relatively weak spring" and not to the spiracular muscles. The evidence on which these and other conclusions are based is not given fully in this paper, but presumably in the thesis referred to.

V. B. Wigglesworth.

STAROSTIN (S. T.). Propriétés physico-mécaniques des ingrédients et leur influence sur le travail de l'aviapulvérisateur et la qualité de la verdification par avion des collections d'eau anophélogènes. [**The Effect of the Carrier-Dust in the Use of Paris Green from Aircraft.**]—*Med. Parasit. & Parasitic Dis.* Moscow. 1940. Vol. 9. No. 1–2. [In Russian pp. 71–77. 12 refs.] [Summarized in *Rev. Applied Entom.* Ser. B. 1941. Feb. Vol. 29. Pt. 2. pp. 24–25.]

"In the course of dusting with Paris green from an aeroplane against Anopheline larvae in the Province of Alma-Ata (Kazakstan) in 1937, it was found that the effectiveness of the treatment largely depended on the carrier with which the larvicide was mixed. Road-dust is the ingredient commonly used in Alma-Ata, and samples of dusts taken in various localities were therefore analysed. The results, which are tabulated, showed that road-dust from different regions possessed widely differing physical and chemical properties. The dusts that flowed best were those that showed little or no reduction in volume when submitted to pressure in a container; dusts that became more compact formed lumps and flowed with difficulty, or, in extreme cases, did not flow at all, whether used alone or mixed with Paris green. In order to prevent the dust from becoming compacted, the aeroplane should be flown as evenly as possible, and jolting when taking off should be reduced to a minimum. The easy flow of the dust was also impaired if it was damp, the least hygroscopic kind proving the best carrier; dust that was exposed throughout the night to the open air became damp and clogged. Road-dust that consisted chiefly of sand and contained only a minimum number of particles of clay (smaller than 0·005 sq. mm. in size) had the most rapid and easy flow, but much depended also on the type of sand. Thus, river or desert sand was the most suitable, as its particles are polished and almost oval in shape, whereas that from mountains or foothills is

angular and more apt to form a compact mass. Road-dusts with the smallest angle of slope had the best flow ; those with an angle of slope greater than 38° were unsatisfactory."

LAZUK (A. D.). Données comparatives sur l'efficacité de diverses méthodes de délarvation des bassins. [**Comparative Values of Antilarval Methods.**]—*Med. Parasit. & Parasitic Dis.* Moscow. 1940. Vol. 9. No. 1–2. [In Russian pp. 78–84. With 3 graphs. French summary.] [Summarized in *Rev. Applied Entom.* Ser. B. 1941. Feb. Vol. 29. Pt. 2. p. 25.]

"Experience in the control of Anopheline larvae in the region of Smolensk (western Russia) suggests that dusting from an aeroplane is impracticable in low-lying densely populated areas near large rivers, as the breeding places are small, scattered and interspersed with pastures and meadows. On the other hand, it is the most effective method of treating large turf-pits in peat-bogs, which are usually inaccessible for hand-dusting. Estimates are given showing that the cost of treating such areas with Paris green from an aeroplane is half that of dusting with Paris green from the ground and one-fifth that of spraying with crude oil. The local effectiveness of the method was demonstrated in 1938 by a steady decrease in the numbers of mosquitos from May to September in cow-sheds and workmen's huts. The aeroplane dusting was supplemented by the destruction of mosquitos in their day-time shelters, the best results being obtained by spraying with an emulsion of 1 gal. kerosene and about 7 lb. soft soap in 30 gals. water."

POGODINA (E. A.) & SOKOLOV (A. G.). Nuages d'alkaloides dans la lutte contre les moustiques. [**Insecticidal Alkaloidal Mists.**]—*Med. Parasit. & Parasitic Dis.* Moscow. 1940. Vol. 9. Nos. 1–2. [In Russian pp. 109–111.] [Summarized in *Rev. Applied Entom.* Ser. B. 1941. Feb. Vol. 29. Pt. 2. p. 27.]

"Investigations were carried out in 1939 in Moscow on the possibility of destroying Anophelines in buildings by the light mist or aerosol resulting from the evaporation of anabasine by heat. One method of obtaining it was to pour a water solution of anabasine sulphate on to quick-lime ; this produces a temperature approaching the boiling point of basic anabasine (280·9°C.) and liberates the latter, which evaporates and condenses in the air to form an aerosol. The correct proportion was found to be 1 part anabasine sulphate and 1 part water to 6 parts lime ; the anabasine sulphate contained 25 per cent. anabasine, 15 per cent. of other slightly toxic alkaloids and 40 per cent. water. The minimum concentration of anabasine in air that killed all Anophelines in the room in 8 minutes was 0·2 oz. per 1,000 cu. ft., and the rate at which anabasine sulphate must be used to give this is 1 oz. per 1,000 cu. ft. This rate is considerably smaller than that required for fumigating with hydrocyanic acid gas. On hot days in summer, the mosquitos abandoned their resting places in about 2 minutes after the aerosol was produced and tried to make their way to a source of fresh air, but then dropped to the floor. Most of them died without moving again, and though a few lived for a day or two and even sucked blood, they did not oviposit. The aerosol has an unpleasant smell and causes coughing ; the mouth and nose

of the operator should therefore be protected with a mask of muslin and moist cotton-wool. In the summer, the aerosol rapidly dispersed, the odour disappeared in 15–20 minutes, and mosquitos released then in a treated room were not affected. At temperatures of 0°C. [32°F.] or below, the dosage of anabasine sulphate had to be increased to 1½ oz. per 1,000 cu. ft. The aerosol produced under these conditions was more stable and killed mosquitos that were introduced into the room an hour after the end of the chemical reaction.

"An aerosol was also produced by dropping basic anabasine or anabasine sulphate (used at rates of 1½–2 and 5–6 oz. per 1,000 cu. ft. of room space, respectively) on sand that had been heated in a pan on a stove to a temperature of 300–350°C. [572–662°F.], which caused the anabasine to evaporate immediately. The aerosol was harmless to rabbits and fowls and did not affect food-stuffs or the germination of seeds. Preliminary investigations showed that mosquitos could also be controlled by an aerosol produced from nicotine or nicotine sulphate by either of the above methods."

SCIENCE NEWS LETTER. 1940. May 11. Vol. 37. No. 19. p. 300. —**Malaria carrying Mosquito now being Battled in Brazil.** [Summary taken from *Public Health Engineering Abstracts.* Washington. 1940. Oct. Vol. 20. No. 10. p. 13. Signed Henry A. JOHNSON.]

A. gambiae was introduced into Brazil in 1930 and now infests 12,000 square miles of territory. This is a very efficient vector of human malaria and creates a potential danger to all American countries. The annual report of the Rockefeller Foundation explains how an attempt is being made to limit the spread of A. gambiae by the creation of a 10-mile-wide zone just beyond the limits of infestation. In this zone all water deposits are mapped and continually treated with larvicide if not drainable. Every road through the area is policed by fumigation squads and all transportation facilities are subject to fumigation. By these means it is hoped to limit the spread of this dangerous malaria vector and perhaps ultimately to eradicate it.

CLARK (H. C.), KOMP (W. H. W.) & JOBBINS (D. M.). **A Tenth Year's Observations on Malaria in Panama, with Reference to the Occurrence of Variations in the Parasite Index, during Continued Treatment with Atabrine and Plasmochine.**—*Amer. Jl. Trop. Med.* 1941. Mar. Vol. 21. No. 2. pp. 191–216. [10 refs.]

This is the tenth and final report on an attempt to control malaria in a group of villages in the mid-basin of the Chagres River in Panama, solely by the administration of atebrin, or quinine, and plasmoquine to all persons found infected in monthly surveys. The attempt has been carried on for 10 years. The scope and aims of the observations have been described in summaries of previous annual reports [this *Bulletin*, 1940, Vol. 37, p. 668]. The painstaking thoroughness devoted to this very extended enquiry endows the authors' conclusions with unusual authority. They consider that it is quite impossible by drug administration to eradicate malaria parasites or reduce them to the point where transmission is very greatly lessened. Drug-control methods cannot prevent an epidemic if unusually great numbers of Anopheles be present, but severe clinical malaria can be almost

eliminated. Atebrin and quinine are equally effective antimalaria drugs: atebrin is more readily administered. Plasmoquine simplex is not thought to have contributed much to the results obtained. Toxic symptoms from the use of plasmoquine were common: all tolerated atebrin well. Non-medical personnel can carry out reasonably good drug-control measures, if supervised by a qualified physician: weekly visits by the physician to labour camps are necessary. A drug-control programme is economically justifiable: increased labour efficiency resulting therefrom is commensurable with the financial outlay.

During the year under review there was an increase in Anopheles breeding. In the month of August the malaria parasite rate in Rio Pescado, a village on an arm of Gatun Lake and comparable in every way with the Chagres villages, but in which no medical treatment was undertaken, was 65·1 per cent. In the same month the malaria parasite rates were in Chagres villages (atebrin and plasmoquine) 7·74, and in San Juan (quinine and plasmoquine) 6·4 per cent. The infections in the Rio Pescado group were much heavier than in those of the treated villages. Most of the malaria cases in the treated villages were relapses. Of the parasites found during the year 72 per cent. were *P. falciparum*, 22 per cent. *P. vivax*, and 6 per cent. *P. malariae*. Local hospital records show a greater prevalence of *P. vivax* than of *P. falciparum*: *P. vivax* causes somewhat more severe subjective symptoms. Of the 286 crescent carriers found only 24 harboured enough crescents to use in mosquito infection experiments. The highest incidence of malaria occurred in age-groups 5 to 10 and 10 to 20 years. *N. W.*

MOOIJ (W.). Malaria-prophylaxis in het Koninklijk Nederlandsch-Indische Leger. [**Malaria Prophylaxis in the Royal Netherlands Indies Army.**]—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1940. Sept. 17. Vol. 80. No. 38. pp. 2231–2241. With 4 figs. on 1 plate & 2 charts. English summary.

In the army the number of primary infections or reinfections was 108 in 1937, and only 47 in 1938, whereas among the fixed population the corresponding figures were 1,393 and 2,141; in the former a 57 per cent. reduction, in the latter a 53 per cent. increase. After experiment, recommendations were made for mosquito-proofing the living rooms with wire of mesh of 1·25 mm. and the use of mosquito-nets with at least 26 meshes to the inch. The mosquitoes used for the tests were *Aëdes aegypti*, *Culex fatigans* and *Anopheles subpictus*. For quinine prophylaxis a dose of 0·4 gm. (6 grains) daily is recommended, though it is acknowledged that it will not prevent infection; it does, however, modify the severity of the attacks. *H. H. S.*

COULSTON (Frederick) & MANWELL (Reginald D.). **Single-Parasite Infections and Exoerythrocytic Schizogony in** *Plasmodium circumflexum.* [Paper read at 16th Ann. Meeting of American Parasitologists. Abstract taken from *Supp. to Jl. Parasitology.* 1940. Dec. Vol. 26. No. 6. p. 27.]

"Despite the very considerable amount of study which has been given to the various problems associated with the occurrence of the pigment-free stages in malaria, the significance of these stages has been

questioned by some, and much still remains to be discovered about them. In particular, it has not yet been possible to rule out completely the possibility that such stages were in reality those of some parasite other than malaria, and—granting that they were stages of the malaria life-cycle—their origin has remained uncertain. Can they originate only from the sporozoites, or from the erythrocytic stages, or do stages in the red cells originate from the pigment-free forms? To settle the question of significance and origin, experiments to test the possibility of obtaining infections from single parasites were undertaken, using *Plasmodium circumflexum.* The results proved positive in a number of cases, both when isolation of single infected red cells, using a Chambers micro-manipulation apparatus, was employed and when dilution methods were used to secure inocula containing one or a very small number of parasites. In general, infections obtained in this way were extremely light and occurred only after a long incubation period. None of the initial infections exhibited exoerythrocytic schizogony, but after a number of passages this type of schizogony re-appeared and thereafter occurred quite regularly. Thus it is certain that the pigmented forms occurring in the erythrocytes can give rise to the pigment-free forms, but the delay in the appearance of the latter suggests that they only develop when the defensive mechanism of the host is severely taxed, as it is by a massive dose of parasites."

MANWELL (Reginald D.). **Life-Cycle of** *Plasmodium relictum* **var.** *matutinum.—Amer. Jl. Trop. Med.* 1940. Nov. Vol. 20. No. 6. pp. 859–866. With 10 figs. on 1 plate. [19 refs.]

The paper gives the results of a study of the life history of *Plasmodium relictum* var. *matutinum* in canaries infected either by blood inoculation or by mosquito bite. Certain differences between the variety studied and other strains of *P. relictum* are noted. Exoerythrocytic schizonts have been found in 9 of 18 birds examined and these include both blood inoculations and mosquito infections. In a footnote it is stated that after the paper was written a canary was infected by injection of a single parasite of the erythrocytic cycle and that in it exoerythrocytic schizonts were also found—a conclusive proof that these forms may arise from the erythrocytic stages. It was found that the exoerythrocytic schizonts did not differ from those of other species of bird malarial parasite. It was found, however, that the schizonts of a species of *Haemoproteus* of the song sparrow differed in certain respects. The mosquito transmissions employed were effected by *Culex pipiens.*

C. M. W.

PORTER (Richard J.) & HUFF (Clay G.). **Review of the Literature on Exo-Erythrocytic Schizogony in Certain Malarial Parasites and its Relation to the Schizogonic Cycle in** *Plasmodium elongatum.* **—***Amer. Jl. Trop. Med.* 1940. Nov. Vol. 20. No. 6. pp. 869–888. [109 refs.]

In this review of the literature based on over 100 published papers the author shows that the exoerythrocytic schizonts have been observed in strains of *Plasmodium relictum, P. gallinaceum, P. cathemerium, P. circumflexum* and *P. nucleophilum* but not in other species of bird malarial parasite. The schizonts of *P. elongatum* occur in

all blood and blood-forming cells but they are not large forms like the exoerythrocytic schizonts of other species. The evidence that these schizonts are developed from sporozoites is reviewed, the conclusion being that though direct development from sporozoites occurs they may also arise from the erythrocytic forms. Bodies resembling to some extent the exoerythrocytic schizonts of bird malarial parasites have been seen in monkey and human malaria (*P. vivax* and *P. falciparum*). The paper is one which should be consulted by all those interested in these stages of development of malarial parasites.

C. M. W.

HELMINTHIASIS.

Précis of Abstracts in this Section.

General.—Li (p. 516) has found ova of helminths in 20 of 72 appendices which also contained either faecal material or faecaliths.

Manson-Bahr (p. 516) reports on phenothiazine as an anthelmintic; in hookworm it is probably ineffective, for roundworms it is useful, but it is most satisfactory in threadworm infections. The details of dosage are given.

Nematodes.—Tomita (p. 517) has succeeded in infecting man with *Strongyloides fülleborni* but not with *S. papillosus.*

Matuda (p. 517) describes some abnormalities of Ascaris eggs.

Chikiamco and Orquiza (p. 517) describe the X-ray diagnosis of Ascaris in the alimentary tract.

Mohr and Lippelt (p. 518) report on complement fixation tests, with an antigen prepared from a filaria of the S. American ostrich, in patients with helminthic infections of various kinds.

Rao (p. 518) found that elephantiasis was common in the town of Ratanpur, Central Provinces, India, and that *Mf. malayi* was the only embryo found. Species of Mansonioides were found breeding in the large tanks covered with Pistia. Soetrisno (p. 518) gives an account of filariasis in the island of Boeroe.

Menon and Ramamurti (p. 519) show that *in vitro Mf. bancrofti* remains alive in citrated blood for only 3 to 4 days, a relatively short time compared with its persistence in saline, but that it is more active in the citrated blood than in the saline. Rupture of the sheath and escape of the embryo takes place in citrated blood, the process being the same as that observed in the stomach of mosquitoes containing infective blood. This process is described. Kobayashi (p. 520) gives instructions for the staining of microfilariae in smears, and describes the organization of *Mf. bancrofti.*

Hu (p. 520) found *Culex pallidothorax* to be susceptible to infection with *W. bancrofti,* but as this mosquito is not commonly found in

houses, it is unlikely to be important in transmission. KARIADE (p. 520) states that the variety known as *Anopheles hyrcanus X* is able to carry *W. malayi*, though not so well as *A. barbirostris*.

From examination of sternal marrow NAPIER *et al.* (p. 521) find no evidence that microfilariae shelter in the bone marrow by day or that they are destroyed by the marrow.

DE SAVITSCH (p. 521) states that the only satisfactory treatment for elephantiasis of the scrotum is surgical, and gives advice, based on his experiences, on a number of technical points.

SUMMERS (p. 522) shows that fleas of various species are not only suitable intermediate hosts for *Dirofilaria immitis*, but are more important in transmission than had previously been supposed.

HAWKING (p. 522) reports on onchocerciasis in S.W. Tanganyika. HARRIS (p. 522) writes on the clinical aspects of onchocerciasis in Kenya with special reference to skin nodules and eye conditions. Treatment with intravenous antimony sodium tartrate was attempted.

In America, SAWITZ *et al.* (p. 523) found that the incidence of Enterobius infection was twice as high in children sleeping in large dormitories as in those in single or double rooms. Eggs were found in various parts of the rooms. In comment, LANE refers to the possibility of air-borne infection. BROWN *et al.* (p. 523) and WELLER and SORENSON (p. 524) record incidence figures from parts of the United States. CRAM (p. 524) gives details of Enterobius infection in white and negro children in Washington, and KUITUNEN-EKBAUM (p. 524) in children in Toronto. MILLER and CHOQUETTE (p. 525) found 33 per cent. of children in a Quebec village to be positive for Enterobius eggs at one examination. OSORIO and MAZZOTTI (p. 525) found Enterobius eggs in anal swabs in 51·6 per cent. of children in Mexico City.

GRAHAM (p. 525) describes a modification of the NIH swab.

GREENE and GREENE (p. 525) report eight cases in which Enterobius was present in the appendix in children ; in seven the diagnosis was acute appendicitis, but in only one was there evidence of acute inflammation. Removal of the appendix cured the symptoms.

MILLER *et al.* (p. 526) report that gentian violet in the treatment of Enterobius infections was effective in 90 per cent. of the cases treated and that untoward effects were practically negligible. In the *Journal of the American Medical Association* (p. 526) is a note to the effect that Butolan produces good results in the alleviation of symptoms but that the drug of choice appears to be gentian violet.

HOLLAENDER *et al.* (pp. 526–527) discuss the effects of ultraviolet radiation on the eggs of *Enterobius vermicularis*.

SAWYER *et al.* (p. 527) describe the clinical course of a case of trichiniasis.

MAUSS (p. 528) shows that trichinous rats transmit partial passive immunity to their young. He (p. 528) shows that the infectivity of larvae after exposure to immune serum is only one-third of that after the use of normal serum. OLIVER-GONZÁLEZ (p. 528) has studied the effect *in vitro* of immune sera on adults and larvae of *Trichinella spiralis*. Precipitates form in the serum round the mouth of the larva and round the other apertures of the adult. These precipitates are associated with the death of many of the larvae. MCCOY (p. 529) observed a rapid elimination of Trichinella larvae in the faeces when

these larvae were given by the mouth to immune rats. Increased secretion of mucus and increased peristalsis appeared to be the chief factors in producing this result. *C. W.*

LI (Y.). **Incidence of Parasitic Ova and Appendicial Faecaliths.**—*Chinese Med. Jl.* 1940. Nov. Vol. 58. No. 5. pp. 592–594.

"Seventy-two appendices collected from surgical specimens and necropsies in Kweiyang over a duration of about 2 years were investigated.

"Among the surgical series there were 6 containing faecaliths and 5 faecal material. Among the 21 necropsy appendices 9 contained faecal material but no faecaliths.

"The total number of appendices containing either faecaliths or faecal material was 20, the contents of all of which revealed parasitic ova. The ova were chiefly ascaris eggs, next in order, the trichocephalus and lastly ankylostoma eggs."

MANSON-BAHR (Philip). **Phenothiazine as an Anthelminthic in Threadworm and Roundworm Infections.**—*Lancet.* 1940. Dec. 28. pp. 808–809.

"Phenothiazine, a thiazine dye, has been shown to be effective against culicine larvae, against strongyloid worms in sheep, and against stomach worms in animals. It is excreted in the urine and acts as a urinary antiseptic.

"Three Indian lascars infested with *Ancylostoma duodenale* were given phenothiazine in doses ranging from 30–40 g. but the results suggest that the drug is ineffective for worms in the small intestine; similar results have been found in animals.

"Nine patients with ascaris lumbricoides were treated; five had a double infection with roundworms and hookworms and two a double infection with roundworms and whipworms. These seven patients were given total doses ranging from 16 to 48 g. Only one roundworm was recovered and the whipworms were unaffected. Of the remaining two patients, one had a multiple infection with roundworms, hookworms, whipworms, and threadworms, the other had roundworms only. They were given 8 g. daily for three days, followed by a dose of sodium sulphate, and results were more satisfactory, all the roundworms being removed.

"Phenothiazine has given good and permanent results in the treatment of threadworm infections, especially in children. Effects on six children and three adults are recorded; all were cured, though three (one child and two adults) required a second course. The following doses are advised: 2 grammes daily for seven days for children under 8, and half the dose for children under 4; 8 grammes daily for at least five days for adults."

Dr. VEVERS forwarded this additional information from the London Zoo.

A young gorilla "was heavily infested with ancylostomes, oesophagostomum and threadworms. It was given 0·3 g. of phenothiazine on the three successive days, March 13–15, 1940. As a result 18 oesophagostomum worms were passed in a dead or dying condition with an unspecified number of threadworms. The gorilla died on May 14, and at the autopsy, done by Col. A. E. Hamerton, no oesophagostomums or threadworms were found in the intestinal canal, though large numbers of ancylostomes were present and had undoubtedly caused the animal's death."

The diagnostic method used for establishing infection and its cure is not stated. *Clayton Lane.*

DOMBROUSKY (A. I.). **The Roentgen Diagnosis of Cysticercus.**—*Amer. Jl. Roentgenology.* 1941. Apr. Vol. 45. No. 4. pp. 558–562. With 8 figs.

NICOLSON (Edward L.). **A Pelvic Hydatid Cyst.**—*Lancet.* 1941. June 21. p. 784.

TOMITA (Susumu). **Experiment on the Susceptibility of Humans to Infection by** *Strongyloides fülleborni* **and with** *S. papillosus.*—*Taiwan Igakkai Zassi* (*Jl. Med. Assoc. Formosa*). 1940. Nov. Vol. 39. No. 11. [In Japanese pp. 1884–1885. English summary p. 1885.]

In these experiments *S. fülleborni* did and *S. papillosus* did not infect man.

The experiments were inflicted by the author on himself and with their consent on five volunteers. After the infection with *S. papillosus* no eggs were passed, after that with *S. fülleborni* eggs appeared in the faeces after 16, 23 and 32 days. The mode of infection is not mentioned in the English summary. *C. L.*

MATUDA (Sizuo). **Some Abnormal Eggs of** *Ascaris lumbricoides* **Linnaeus.**—Reprinted from *Volumen Jubilare Pro Prof. Sadao Yoshida.* Osaka. Japan. 1939. Mar. Vol. 2 in *Collected Papers from the Faculty of Medicine, Osaka Imperial University.* 1939. pp. 111–114. With 10 figs. on 2 plates. [10 refs.]

The abnormalities described consist of agglomerations of fertile eggs, numbers up to seven being stuck together by their outer albuminous shells, of size unusually large or small, of shape including buds or indentations, of lack of the outer shell. The usual barrel-shaped unfertile egg with its coarse granular or globular contents is not mentioned. [The reference in the text to the figure of an egg lacking an albuminous covering should have been cited as Pl. II, fig. 10.] *C. L.*

CHIKIAMCO (Paterno S.) & ORQUIZA (Clodualdo T.). **Roentgen Diagnosis of Ascaris in the Gastro-Intestinal Tract.**—*Acta Med. Philippina.* 1940. July–Sept. Vol. 2. No. 1. pp. 15–20. With 7 plates.

An X-ray plate made 4 to 6 hours after an opaque meal displays an Ascaris as a cylindrical or coiled filling defect, as a string-like shadow thrown by the opaque substance which the parasite has itself swallowed, as two lines of shadow where this has clung to the worm's cuticle, or as a small polyp-like defect when the worm lies in the direction of the rays. In children this diagnostic measure fails, it is believed because they cannot take enough of the contrast substance to cause a filling defect and can hardly follow the instructions given during radiography. *C. L.*

VON BRAND (Theodor). **Aerobic Fat Metabolism of** *Ascaris lumbricoides.*—*Proc. Soc. Experim. Biol. & Med.* 1941. Mar. Vol. 46. No. 3. pp. 417–418.

MOHR (Werner) & LIPPELT (Heinrich). Bericht ueber weitere Ergebnisse mit der Filarien-Komplementbindungsreaktion. [**Further Work on the Filaria Complement Fixation Test.**]—*Klin. Woch.* 1940. Feb. 17. Vol. 19. No. 7. pp. 157–159.

The antigen was made from *Contortospiculum rheae,* a filarial nematode parasite in the South American "ostrich." It was tested on 14 persons; all were negative for hookworm eggs and 12 were negative to the Wassermann test.

The reaction in two *A. perstans* and in two *Loa loa* infections was classed as ++++, and in the third from each group it was negative. It also showed as +++ in two persons who came from filaria-ridden countries, in one old case of *W. bancrofti* infection and in three showing Calabar swellings. Another table shows the antigen reaction in persons who had no microfilariae in the blood; it was +++ in two with ankylostomiasis alone, in one with ankylostomiasis and infection with *Schistosoma mansoni* and in one with subtertian malaria. It was ++ in one with ankylostomiasis and *S. mansoni* infection and in one with tertiary syphilis. It was + in one with secondary syphilis. In 7 with ankylostomiasis, one with *S. mansoni* infection, and 4 with *S. japonica* infection, the reaction was negative. *C. L.*

RAO (S. Sundar). **Study of Filarial Infection in Ratanpur (Central Provinces).**—*Indian Jl. Med. Res.* 1940. Oct. Vol. 28. No. 2. pp. 609–613. With 1 map.

Elephantiasis is common in the town of Ratanpur, Central Provinces, India, but almost or wholly absent in neighbouring localities. Accordingly this survey was made.

House-to-house visits showed elephantiasis of legs or hands in 78 of a population of about 2,000. A blood survey of 191 persons made between 9 and 10 p.m. showed *Mf. malayi* in 31 (16·23 per cent.); *Mf. bancrofti* was absent from the slides. The prevalent mosquito species, identified by IYENGAR, were *Mansonia* (*Mansonioides*) *annulifera, M. uniformis, Culex vishnui, C. fatigans, Anopheles pallidus* and *A. annularis.* The *Mansonioides* breed in most of the big tanks, all of which are covered with Pistia; Culex breed in broken pots near wells.

C. L.

SOETRISNO. De bevolking der Wae Apo-vlakte en de aldaar voorkomende filariasis (Eiland Boeroe). [**Filariasis among the inhabitants of the Wae Apo Plain (Boeroe Island).**]—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1940. Oct. 1. Vol. 80. No. 40. pp. 2349–2375. With 8 figs. on 1 plate, 2 plans, 1 map & 1 chart.

Among 832 persons belonging to 23 kampongs in this district there were 431 whose blood examination revealed microfilariae, *i.e.* 51·8 per cent.; 218, or 26·2 per cent., of preparations made during the day were positive. Making up the total were 298 men of whom 186 (63·8 per cent.) were positive, 200 women, 98 (49 per cent.), children over

six years 195, 89 (45·5 per cent.) and under six years 139, of whom 58, or 40·1 per cent., were positive. In one kampong, among 35 persons examined seven showed filarial embryos in day specimens and 84 per cent. (? 29) in night specimens. The accompanying outline map shows the wide range of infestation, from 10·8 per cent. (Nalbessy kampong) to 84 per cent. (Wageren Migodo). *H. H. S.*

Outline map of the district. The figures represent the incidence of Filarial infestation in percentages.

[Reproduced from *Geneeskundig Tijdschrift voor Nederlandsch-Indië.*]

MENON (T. Bhaskara) & RAMAMURTI (B.). **Preservation *in vitro* of *Microfilaria bancrofti* and a Study of the Mechanism of Ex-Sheathing.**—*Indian Jl. Med. Res.* 1940. Oct. Vol. 28. No. 2. pp. 615–620. With 1 plate.

A study of *Mf. bancrofti* was undertaken *in vitro* to determine its survival period, growth and unsheathing.

Ten media were used, and in those tests which were run at 10°C. microfilarial life was shortest in citrated whole blood, namely 3 to 4 days, and longest in normal saline, namely 40 to 50 days. A study of tables brings out the fact, surely significant, that in citrated blood activity was "good," it is the only medium regarding which that adjective is used, whereas in normal saline it was feeble, also a unique comment. Whether microfilariae died soon or lived long, no development or growth took place, though some showed degenerative haziness on staining. Unsheathing was not caused by acid or alkaline buffer solutions, by peptic digestion or by chilling and thawing.

" Fibrin also gave negative results " but " in artificial media the formation of small leucocyte-fibrin masses derived from blood could be observed. The microfilariae seemed to concentrate around and within the semi-solid matrix of these masses in great numbers as if by a process of taxis. They showed a definite tendency to pass through the mass by vigorous wriggling movements. During this process the loose posterior end of the sheath became attached to the mass, the sheath was ruptured and the embryo slowly appeared to wriggle out. The whole process took from a few hours to twenty-four hours before the embryos could be free.

" This mechanism was found to be exactly similar to what took place in observations carried out on the mosquito's stomach full with infective blood feed. The blood clotted and became viscid in the foregut and it could be observed that in about twelve to twenty-four hours after the feed ex-sheathed embryos had wriggled out of the clots and even the stomach wall."

C. L.

KOBAYASHI (Hidekazu). **Supplementary Study regarding the Organization of** *Microfilaria bancrofti.*—*Taiwan Igakkai Zassi* (*Jl. Med. Assoc. Formosa*). 1940. Oct. Vol. 39. No. 10. [In Japanese pp. 1651–1657. [25 refs.] English summary pp. 1658–1659. With 2 plates.]

This special form of staining was used :—

" The smears, dried in air 2–24 hours, after being haemolyzed in distilled water were transferred directly into diluted Giemsa's solution —1 drop of dye to 2 cc. of distilled water—for 40 to 60 minutes and over stained, then washed in tap water for several minutes, after which they were differentiated in methyl-alcohol and washed in tap water quickly."

" In the author's studies, he found that there are special primordial cells for the anterior- and posterior- oesophagus, and mid-intestine ; the 1st ones were situated anteriorly to the nerve ring, the 2nd situated at about the centre of the larva and the 3rd situated at the close behind the 2nd. Those cell groups could easily be distinguished by vital staining and by the author's modified staining method using Giemsa's dye.

" The genital anlage lies at the ventral aspect near the primordial cells of the posterior oesophagus and mid-intestine at a point varying from 39·54 to 53·19 per cent. from the head of the larva, of course it has no relationship with the G-cells."

HU (Stephen M. K.). *Culex pallidothorax* **Theobald as a Carrier of** *Wuchereria bancrofti* **Cobbold.**—*Lingnan Sci. Jl.* 1940. Oct. 26. Vol. 19. No. 4. pp. 543–547.

" 1. *Culex pallidothorax* was found to be susceptible to experimental infection with *Wuchereria bancrofti.*

" 2. All the filarial larvae in the *Culex pallidothorax* found to be positive to the infection at the time of dissection were of the infective stage.

" 3. As *Culex pallidothorax* is not a common household mosquito in Shanghai, it is not likely to play an important part in the transmission of *Wuchereria bancrofti* infection in this region."

KARIADI. A. hyrcanus " X " en filariasis malayi te Martapoera. [*A. hyrcanus X* **and Filariasis in Martapoera.**]—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1941. Jan. 21. Vol. 81. No. 3. pp. 107–118. With 3 figs. [13 refs.] English summary.

" Anopheles hyrcanus ' X,' a variety of hyrcanus, is very abundant in Martapoera and forms in the wet part of the year a real plague. A. hyrcanus X is able to carry Filaria Malayi.

"According to recent investigations made at Martapoera, this ability is less developed in comparison with local Mansonia uniformis and much less in comparison with *A. barbirostris* at Kalawara.

"On account of the large numbers of mosquitoes present and their anthropophily the danger must not be underestimated." [See also this *Bulletin*, 1940, Vol. 37, p. 667.]

NAPIER (L. Everard), DAS GUPTA (C. R.) & RAO (S. Sundar). **Sternal Puncture in Filariasis.**—*Indian Jl. Med. Res.* 1940. Oct. Vol. 28. No. 2. pp. 605–608.

"1. Sternal puncture was done in 53 cases of filariasis. In three out of 46 cases done during the daytime and in ten out of ten done at night, microfilariae were found. In all instances there were more microfilariae in the peripheral blood than in the sternal-puncture fluid.

"2. There is thus no evidence that microfilariae shelter in the bone-marrow during the day, or that they are destroyed in the marrow.

"3. The cytological analysis of the material does not suggest that there is any change in the bone-marrow in this infection, and in fact the nucleated-cell counts might well be taken as a normal series."

DE SAVITSCH (Eugene). **Surgical Treatment of Elephantiasis of the Scrotum and Penis.**—*Jl. Urology.* 1941. Feb. Vol. 45. No. 2. pp. 216–222. With 5 figs.

"The only satisfactory treatment is surgical and its success depends largely on the ability to mobilize sufficient healthy skin to permit construction of a new scrotum."

Spinal anaesthesia has been used, partly because there are so few competent general anaesthetists in the Stanleyville district of the

Incision for elephantiasis of the scrotum.
[Reproduced from the *Journal of Urology*.]

Belgian Congo. One case only of elephantiasis of the penis has been seen, and skin grafting after operation is not advised, for

local patients will not leave dressings alone, and granulation and growth of epithelium from the wound margin gives a satisfactorily functioning organ.

For the scrotal operation the mass is transfixed by a hook hung from the ceiling and hauled up as required. As tourniquet, the inner tube of a bicycle tyre is described as of tremendous advantage. "The size of the flap for covering the penis is determined by palpating the penis through the mass and giving a leeway of about half an inch on its borders." After tracing the flaps their detachment brings into view the underlying gelatinous tissue which the fingers easily separate from the skin. The penile flap must be secured to the corona or it will slip away at the first erection. The need of precise care in securing blood vessels is repeatedly stressed. Savitsch does not give the number of his operations but quotes DE GREEF as having had recurrence in three only of 100 cases. *C. L.*

SUMMERS (William A.). **Fleas as Acceptable Intermediate Hosts of the Dog Heartworm,** *Dirofilaria immitis.*—*Proc. Soc. Exp. Biol. & Med.* 1940. Mar. Vol. 43. No. 3. pp. 448–450.

In any further work on Dirofilaria, undertaken for its bearing on Bancroftian or other human filariasis, these facts may prove helpful.

"The fleas, *Ctenocephalides canis, C. felis* and *Pulex irritans,* collected from dogs harboring *Dirofilaria immitis,* have been found naturally infected with the microfilarial and larval stages of this parasite. The female fleas seemed much more susceptible to the infection than the males. All 3 species of fleas have been experimentally infected and in all 3 the extra-mammalian phase of the life cycle has been completed. The time required for this development in fleas was 120 hours in warm weather and 216 hours in cold weather. This phase of the life cycle was more rapidly achieved in fleas than in mosquitoes. It appears that both biologically and epidemiologically fleas are more suitable intermediate hosts of *Dirofilaria immitis* than had been previously supposed."

C. L.

HAWKING (Frank). **Onchocerciasis in Tanganyika Territory.**—*Ann. Trop. Med. & Parasit.* 1940. Dec. 31. Vol. 34. Nos. 3 & 4. pp. 211–215.

The investigation was made during May, which is the end of the rainy season, at places in the south-west portion of Tanganyika Territory.

There were examined 1,087 persons; from those with nodules or with eye troubles and from many others skin shavings were taken from the suspected nodule or between the scapulae. Of 236 shavings so made, microfilariae were found in eight, and of these positives one had a nodule and three had eye trouble not necessarily claimed as onchocercal. *C. L.*

HARRIS (B. P.). **Clinical Aspects of Onchocerciasis in the South Kavirondo District of Kenya Colony.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1940. Nov. 30. Vol. 34. No. 3. pp. 233–248. With 2 figs. (1 map). [10 refs.]

A clinical investigation linked with MCMAHON's skin snippings [this *Bulletin,* 1941, Vol. 38, p. 154] and the work of HAWKING above.

In 257 persons examined, the commonest signs were skin nodules, present in 31·1 per cent. of those in whom a single skin snip showed microfilariae, and in 22·8 per cent. of those in whom it did not; in these two groups the percentages with abnormal skin were 23·0 and 14·1, with pain in the eyes were 16·0 and 11·4, with sight poor or with abnormal appearance of the eye 14·0 and 8·7. As usual, nodule sites were related to superficial bones—ribs, especially in the axillary line, iliac crests, anterior spines, sacrum, occipital ridges, behind the ears. Two in less usual sites (over the great trochanter and over the ischial tuberosity) were cut out and both showed worms. The first skin affection was an itching rash, the skin thickened and either became elephantoid with enlarged lymph nodes, or appeared to pass into general atrophy. Harris in considering the eye lesions disclaims a specialist's position. Mention is made of an appearance like an arcus senilis in the relatively young, of corneal opacity beginning in its lower part, and also of iritis, keratitis and cataract. Trachoma and avitaminosis are given as possible factors in causing eye troubles. Treatment by intravenous injection of antimony sodium tartrate was given to 16 persons after a nodule, if one were present, had been excised. In 12 of these the microfilariae disappeared from the skin blood, and the eosinophil percentage commonly dropped, but the figures in the table do not suggest that these changes ran parallel. The needed lines of investigation are outlined, and the Kodera Location, in which this investigation was put through, is believed to be particularly suitable for such work. *C. L.*

SAWITZ (Willi), D'ANTONI (Joseph S.), RHUDE (Kenneth) & LOB (Sydney). **Studies on the Epidemiology of Oxyuriasis.**—*Southern Med. Jl.* 1940. Sept. Vol. 33. No. 9. pp. 913–921. With 5 figs. [20 refs.]

This investigation covers examination by the NIH swab, in six children's homes in New Orleans, of 278 white boys, 87 white girls, 63 coloured boys and 63 coloured girls.

The percentage incidences of these were severally 89·1, 60·9, 84·1 and 15·9. Infection increased with age up to 14 years and then lessened. In those of comparable age, it was twice as common among those sleeping in large dormitories as in those in single or double rooms, it was not lessened by care in keeping clean the house, clothing or bedding, it was not increased in nail biters; it had no relation to expenditure on food or maintenance; it is held to be passed on by direct contact. Eggs were collected not only from clothes but also from ledges of pillars, windows and doors. [The likelihood of air-carriage is not considered. Regarding this the work of NOLAN and REARDON (this *Bulletin*, 1939, Vol. 36, p. 845) merits special note and air-carriage seems to fit all the facts.] *C. L.*

BROWN (H. W.), SHELDON (A. J.) & THURSTON (T.). **The Incidence of Pinworm** (*Enterobius vermicularis*) **Infection in North Carolina.**—*Southern Med. Jl.* 1940. Sept. Vol. 33. No. 9. pp. 922–925.

By a single examination with the NIH swab there were examined: (1) 132 white boys at the Charlotte Observer Fresh Air Camp; (2) 100 white and negro patients of all ages in an outpatient clinic at Durham, North Carolina; (3) 118 male students of the university of N. Carolina.

For these three groups the percentages of infection were respectively : (1) 38·8 ; (2) 7·4 in 67 whites and 0 in 33 negroes ; (3) 0. "The failure to find a single pinworm infection in 33 negroes . . . is unusual. The negroes' habits of personal hygiene are such that we could be led to expect a high pinworm infection rate among them." *C. L.*

WELLER (Thomas H.) & SORENSON (Charles W.). **Enterobiasis : its Incidence and Symptomatology in a Group of 505 Children.**—*New England Jl. of Med.* 1941. Jan. 23. Vol. 224. No. 4. pp. 143–146. [10 refs.]

The children, nearly equally divided between boys and girls, were examined, usually once only after the morning "toilet," by the NIH cellophane swab, and 19 per cent. found infected, 23 in girls and 15 in boys. They had no symptoms. *C. L.*

CRAM (E. B.). **Studies on Oxyuriasis. XXIV. Comparative Findings in the White and Negro Races.**—*Proc. Hel. Soc.* Wash. 1940. Jan. Vol. 7. No. 1. pp. 31–35.

The author's summary reads as follows :—

"NIH anal swab examinations for *Enterobius vermicularis* were made on children of the white and Negro races in nursery schools and summer camps. Four swabbings per child showed an incidence of 33 per cent. in 209 white children and of 19·8 per cent. in 131 Negroes. In children of school age, 6 to 12 years old, examined in camp, there was only a slight difference in the incidence in the two races, 25·2 per cent. in whites as compared with 20·6 per cent. in Negroes ; however, this sample of white children, exclusively Jewish, showed a much lower rate of infection than have other comparable samples previously reported. In nursery school-children, 2 to 5 years old, there was found an incidence of 51·6 per cent. in whites compared to 19·1 per cent. in Negroes. The findings are analyzed as regards the incidence in the two sexes and the relation of positive and negative findings. [Elsewhere the author states "The findings in the two sexes were almost identical, or actually identical, in both races."] Addition of these persons to others examined from the general population of Washington, D.C., brings the total to 2,582 white persons, with the finding of pinworms in 1,081, or 41·9 per cent., and 789 Negroes, with the finding of pinworms in 122, or 15·5 per cent."

KUITUNEN-EKBAUM (E.). **Intestinal Parasites in Children in Toronto.**—*Amer. Jl. Dis. Children.* 1940. Sept. Vol. 60. No. 3. pp. 518–525.

Stool samples from 438 children showed protozoa or helminths in 33·56 per cent.

Apart from saline and iodine smears, the methods used cannot be identified from the designations given. Among the helminthic infections so disclosed were *Diphyllobothrium latum* 1, Taenia 1, Ascaris 1, Trichuris 1, threadworms 16 ; but for the last infection the NIH swab used and repeated gave an infection percentage of 48·6, with variations between 32·1 and 73·1 in 843 children in different institutions, and with the highest incidence between the ages of 6 and 14. *C. L.*

MILLER (Max J.) & CHOQUETTE (Laurent). **Studies in Pinworm Infection in Canada. I. The Incidence of Pinworm Infection in French-Canadian School Children.**—*Canadian Med. Assoc. Jl.* 1940. Nov. Vol. 43. No. 5. pp. 453–455. With 1 chart.

The examinations were made with the NIH swab used once on each child between 9 a.m. and 2 p.m. It could not be found out whether some had not been bathed that day.

"An examination of 198 school children from six to 16 years of age in a Quebec village showed 33 per cent. to be positive for pinworms in one swab examination. Calculated on the basis of seven swabs it indicates that approximately 47 per cent. of the children are infected with pinworms."

C. L.

OSORIO (María Teresa) & MAZZOTTI (Luis). Examen de niños en tres instituciones escolares para investigar la presencia de oxiuros. [**Investigation in 3 Schools on the Incidence of Threadworms.**]—*Rev. Inst. Salubridad y Enfermedad. Trop.* Mexico. 1940. Sept. Vol. 1. No. 3. pp. 265–273. With 2 figs. English summary (7 lines).

"Results of examinations for oxyuriasis in three school Institutions of the city of Mexico, using the NIH swab, are reported in this paper. . . .

"From a total of 684 scholars 51·6 per cent. were found infected.

"The incidence found is undoubtedly lower than the real one, as only one swab was taken from each individual."

GRAHAM (Clarence F.). **A Device for the Diagnosis of Enterobius Infection.**—*Amer. Jl. Trop. Med.* 1941. Jan. Vol. 21. No. 1. pp. 159–161. With 4 figs.

A modification of Hall's NIH swab using an adhesive cellulose tape. Transparent "Scotch cellulose tape" is adherent on one side. A piece 8 cm. long is cut from a half-inch roll, about 1 cm. at each end is turned over to form ends that do not stick to the forceps that hold the strip in a loop, sticky side out. This sticky surface is dabbed on the perineal skin and picks up epithelial scales, faecal particles and eggs if they are present. The strip is placed face down along a microscope slide, the turned-up ends being cut off if they get in the way. The reproduced photographs are striking. *C. L.*

GREENE (Earle I.) & GREENE (J. Major). **Appendiceal Oxyuriasis.**—*Amer. Jl. Surgery.* 1940. May. Vol. 48. No. 2. pp. 440–443. [31 refs.]

"1. Eight cases of [children with] appendiceal oxyuriasis are presented.

"2. Seven were diagnosed as acute appendicitis.

"3. No symptom or lack of symptoms will differentiate the disease from a true acute appendicitis.

"4. Removal of the appendix cures the patient.

"Free fluid in the abdominal cavity was found five times. Two appendices had bulbous tips. Two contained fecaliths. An edematous organ was reported twice.

"Three organs were diagnosed as acute appendicitis by the operating surgeon. One was called an obstructive appendicitis, another, a chronic interval appendix; the others were considered as subacute specimens.

"Only one of the cases was reported as having any evidence of acute inflammation. All others were reported as containing the oxyuris.

"After the worms were discovered, the stools of four patients were examined. The worm was isolated once; eggs were found in one instance, whereas in the other two the stools were negative."

[The high incidence of Enterobius infection in children in the U.S.A., newly displayed by the use of Hall's NIH swab, will surely foster examinations to determine whether the acute condition is commoner in those with or without infection. If in those with, the need to detect and remove infection is great.] *C. L.*

MILLER (Max J.), CHOQUETTE (Laurent), AUDET (Wilfred), KELSO (R. F.) & GUENETTE (J. A.). **Studies on Pinworm Infection. II. Tests with Gentian Violet in the Treatment of Pinworm Infection.**—*Canadian Med. Assoc. Jl.* 1940. Nov. Vol. 43. No. 5. pp. 455–458.

"Gentian violet in tablet form was tested against pinworm infection in 29 school children ranging from 6 to 13 years of age inclusive. The drug was administered over a period of 10 consecutive days, the children 6 to 9 years of age inclusive getting two 3/20th grain tablets, three times a day, and those 10 to 13 years of age inclusive, getting one ½ grain tablet three times a day. The drug was found to be efficient in approximately 90 per cent. of the cases treated, as determined by three post-treatment examinations made by the NIH anal swab technique.

"Untoward effects of the drug were practically negligible. Vomiting occurred in two children, one of whom was in error given more than the prescribed dosage, and the other, a child of 5, who was given three 3/20th grain tablets daily for nine days. Both children were under weight, with poor appetites, and it is suggested that the treatment of such cases be extended over a longer period, short treatment periods being followed by treatment-free periods of equal length.

"The history of 41 persons infected with pinworm showed the more common symptoms of pinworm infections to be nervousness, restless sleep, pruritus of the anal region, and nocturia."

JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION. 1940. Nov. 30. Vol. 115. No. 22. p. 1909.—**Butolan for Pinworms.** [Queries and Minor Notes.]

The query is concerned with possible contraindications to the use of Butolan in *E. vermicularis* infections. In reply it is stated that no contraindications have been noted. Good results have been recorded with the drug but these were probably based on the alleviation of symptoms rather than on the evidence of anal swabs. At present the drug of choice appears to be gentian violet given by the mouth [see this *Bulletin*, 1940, Vol. 37, p. 649]. *C. W.*

HOLLAENDER (Alexander), JONES (Myrna F.) & JACOBS (Leon). **The Effects of Monochromatic Ultraviolet Radiation on Eggs of the Nematode,** *Enterobius vermicularis.* **I. Quantitative Response.**—*Jl. Parasitology.* 1940. Oct. Vol. 26. No. 5. pp. 421–432. With 4 figs. [19 refs.]

Ultraviolet radiation lessened the survival prospects of Enterobius eggs.

"The egg shell consists of three different layers. The outermost layer is protein, the middle layer chitin, and the innermost layer

lipoids . . . . The inhibition of hatching by ultraviolet radiation could be produced first by a hardening of the outside protein layer, second, by a change in the composition of the lipoid membrane, third, by irradiation injuring the embryo within the shell, and fourth, by possible toxic substances formed in the egg by this radiation. The production of toxic substances seems the least likely explanation with the energy values used in these experiments. It would seem from the evidence of the shape of the killing curves that death is probably caused by a combination of several factors and not a single effect produced by irradiation."

[Chitin of insects is insoluble in caustic alkalis but "chitin" of helminths is readily soluble in them. The use of the term chitinoid for the latter will prevent confusion.] *C. L.*

JONES (Myrna F.), JACOBS (Leon) & HOLLAENDER (Alexander). **The Effects of Monochromatic Ultraviolet Radiation on Eggs of the Nematode,** *Enterobius vermicularis*. **II. Sublethal Effects.**—*Jl. Parasitology*. 1940. Dec. Vol. 26. No. 6. pp. 435–445. With 3 figs. [14 refs.]

"1. The rate of hatch is slower for eggs, irradiated with monochromatic ultraviolet radiation given considerable energy, than for controls.

"2. A delayed lethal effect of ultraviolet radiation is indicated, since eggs stored after having been irradiated with a considerable amount of energy showed a smaller percentage hatch than others of the same batch which were tested immediately.

"3. Many larvae which hatched from irradiated eggs survived for a shorter time than those hatching from eggs in control dishes.

"4. Ultraviolet radiation is more damaging to immature eggs than to those which have attained the ring-and-a-half or infective stage."

SAWYER (Kenneth C.), LIGGETT (R. S.) & DAY (Hughes W.). **Trichinosis from a Clinical Standpoint.**—*Rocky Mountain Med. Jl.* 1940. Dec. Vol. 37. No. 12. pp. 984–986. With 3 figs.

"We present the following case of trichinosis because of its unusual clinical picture and to illustrate the point that we may be missing many atypical cases of this disease."

An Italian woman of 25 came to hospital complaining of weakness and swelling of the eyelids; she had high fever with rigor, and eosinophils were 6 per cent. On questioning her next morning the eating of fresh pork was admitted but she insisted that it had been well cooked; the eosinophils were then recorded at 12 per cent. Later on she admitted to eating raw sausage a fortnight before her illness began, and some of this was obtained and shown to contain many Trichinella cysts. On the 7th day after admission to hospital violent purging demonstrated "many trichina worms in her stools," the microphotograph indicating that adults were in mind. "A positive skin test was present on the fifth day and a blood precipitin test drawn on the tenth day of the patient's illness was negative in all dilutions. Blood drawn 3 weeks later gave a positive report in dilutions of 1 : 1280."

C. L.

MAUSS (Evelyn Abrams). **Transmission of Immunity to *Trichinella spiralis* from Infected Animals to their Offspring.**—*Amer. Jl. Hyg.* 1940. Sept. Vol. 32. No. 2. Sect. D. pp. 75–79.

"In the offspring of trichinous rats, rabbits, and hamsters, the percentage development of infecting doses of trichina larvae was lower than in the offspring of uninfected animals. This lowered susceptibility to infection was lost by the hamsters as early as the third week after birth. The time before parturition of infection of the mother hamsters did not appear to influence the degree of immunity transmitted to the young. Examination for trichinae after complete digestion of the musculatures of five rats, five rabbits, and 24 hamsters, all offspring of infected mothers, revealed not one case of prenatal infection, eliminating actively acquired immunity as a possible cause for the partial immunity demonstrated to exist in these animals."

MAUSS (Evelyn Abrams). **The in Vitro Effect of Immune Serum upon *Trichinella spiralis* Larvae.**—*Amer. Jl. Hyg.* 1940. Sept. Vol. 32. No. 2. Sect. D. pp. 80–83.

"*Trichinella spiralis* larvae which have been incubated at 37°C. for 18 hours in 43 per cent. homologous immune serum are only 30 per cent. as infective as larvae which have been incubated under the same conditions in 43 per cent. normal serum. There is a similar reduction in infectivity of larvae exposed to 0·9 saline solution, but the reduction becomes statistically insignificant when 10 per cent. normal rabbit serum is added to the saline."

OLIVER-GONZÁLEZ (José). **The in vitro Action of Immune Serum on the Larvae and Adults of *Trichinella spiralis*.**—*Jl. Infect. Dis.* 1940. Nov.–Dec. Vol. 67. No. 3. pp. 292–300. With 8 figs. [18 refs.]

The immune sera used in these tests came from rats, guineapigs and rabbits. They were of two sorts—the first from animals that had had by mouth a single dose of infective larvae 8 to 10 weeks earlier, conveniently labelled immune serum, the second from others that had been given small and gradually increasing feeds of trichinous meat [BACHMAN & GONZÁLEZ, see this *Bulletin*, 1937, Vol. 34, p. 458], and obtained 3 to 4 weeks after the last feed, and labelled hyperimmune serum. Sera were kept at 6°C. till used, which was usually next day.

The adult worms were got by flushing with normal saline the unopened gut of rats infected 4 to 7 days earlier, the infective larvae by digesting rat muscle in pepsin and hydrochloric acid; the freed parasites were then washed in 1 in 20,000 solution of merthiolate, the cleaned larvae for at least, the adults for at most, 30 minutes. The tests were made by placing in a hollow slide about 5 parasites in a mixture of one drop of normal saline and four drops of serum.

"The action of specific immune and hyperimmune serums from rats, guineapigs and rabbits was tested in vitro on larvae and adults of Trichinella spiralis. In all of the immune and hyperimmune serums precipitate formed in large masses around the mouth of the larvae and was associated with immobilization, disintegration and death of many of the larvae. In addition to the oral precipitate, anal and vulval precipitates were formed around the adults. The vulval precipitate seemed to obliterate the opening and may be the mechanism whereby the escape of the embryos is prevented in immune serums."

"The time at which precipitates appeared varied according to the degree of immunization. In the serum from the hyper-immune animals precipitates appeared earlier and were denser than in the serum from immune animals. Inactivated serum was as effective as unheated or complemented serum.

"No precipitates were formed around the larvae or adult worms when placed in normal or in anti-Cysticercus-crassicollis serum.

"Serum from rabbits immunized with saline suspensions of powdered larvae apparently caused the death of over 50 per cent. of the larvae, but had little or no effect on the adults.

"Emphasis is laid upon the probable role of specific antibodies in acquired immunity to Trichinella spiralis."

C. L.

McCoy (O. R.). **Rapid Loss of Trichinella Larvae fed to Immune Rats and its Bearing on the Mechanism of Immunity.**—*Amer. Jl. Hyg.* 1940. Nov. Vol. 32. No. 3. Sect. D. pp. 105–116. With 2 figs. [11 refs.]

"Rats were made resistant to further infection with *Trichinella spiralis* by feeding them three or more sublethal doses of *Trichinella* larvae over a period of several months. When test doses of larvae were fed to these rats, the larvae were rapidly lost from the intestine, considerable numbers appearing in the feces as soon as 3 hours after feeding. Most of the immunized rats developed diarrhea within a few hours, and after 8 to 18 hours had eliminated the majority of the larvae fed. The larvae passed in the feces were alive and developed normally when fed to normal rats. No evidence of an abnormal cellular reaction was observed in the intestinal wall of immunized rats killed at intervals after feeding the test dose of larvae. The increased secretion of mucus and increased intestinal peristalsis appeared to be the chief factors that operated to expell the larvae from the intestines of resistant rats."

MISCELLANEOUS.

Manson-Bahr (Philip). **The Prevalent Diseases of Italian East Africa.**—*Lancet.* 1941. May 10. pp. 609–612. With 1 fig. [61 refs.]

This, the second paper on the diseases prevalent in the Italian African Empire, is as valuable as the first, which was reviewed in this *Bulletin*, 1941, Vol. 38, p. 415. It will be of great service to the British medical staffs to whom will fall the duty of supervising the health of Europeans and natives in East Africa.

The diseases dealt with are malaria, largely due to *Plasmodium falciparum* carried by *Anopheles gambiae*, leishmaniasis, relapsing fever, yellow fever, typhus, of which the louse-borne type is the most frequent, plague and the dysenteries. Of general diseases pneumonia, cerebrospinal fever, tropical ulcer, rabies and smallpox are common, venereal diseases are widespread and helminthic infestations, of which *Taenia saginata* infection is the chief, are widely seen. There are foci of bilharzia. The common snakes are referred to. The sections on these diseases are so full of facts that they cannot be abstracted; the information given is accurate and is up to date.

In the final paragraph is a comment on the information available from Italian sources. It is shown that the reports issued by the

military authorities concerning the health experiences during the war of 1935 36 conflict strongly with those subsequently published by Italian medical men, and present, perhaps, too rosy a picture of general health during military operations. *C. W.*

WESTERN SAMOA, MANDATED TERRITORY OF: TWENTIETH REPORT OF THE GOVERNMENT OF NEW ZEALAND ON THE ADMINISTRATION OF, FOR THE YEAR ENDED 31ST MARCH, 1940. pp. 10–13.—**Health.**

The complete health staff comprises 19 Europeans, 137 Samoans and one Chinese dresser; there are 3 European medical officers, 14 native medical practitioners, one dental officer, one dispenser, and a bacteriologist, all Europeans, a matron, 8 European sisters and 77 native nurses, including some undergoing training. During the year 18 probationers began their training. Two Samoan students finished their four years' course at the Central Medical School, Suva. The Native Medical Practitioners (N.M.P.s) now number fourteen. There are 9 students in Suva and 6 cadets at Apia Hospital undergoing preparatory training.

A new X-ray and a diathermy apparatus were installed during 1939. Admissions to hospitals numbered 2,475 (2,211 in 1938) and out-patients 30,735 (24,417). Yaws is common, and enteric fever occurs sporadically. There was a small outbreak [number of population or cases not stated] in the village of Iva, Savai'i, but it was soon brought under control and contacts inoculated. Five lepers were admitted to hospital during the year, members of the families of lepers are examined every year for detection of early cases. Pulmonary tuberculosis is mostly limited to Apia and the western environs. Samoans are slow in realizing its infectiveness. "Malignant jaundice" occurs and from the description there is little doubt that it is of leptospiral origin though the strain has not yet been determined.

Six natives are undergoing training as dentists. The period of tuition is three years and is followed by two years in the dental clinic. Infant mortality is given as 83·56 per mille, an increase of 9·77 on the figure for the preceding year, but, says the report "... returns, whilst improving in reliability, do not display a high degree of accuracy."

H. H. S.

SHUTE (P. G.). **A Species of Mosquito infesting Deep Shelters in London.**—*Lancet.* 1941. Jan. 4. pp. 6–7.

Since the underground railway stations in London have been used as air-raid shelters many people taking refuge there have complained of being bitten by mosquitoes. Investigation has shown that the species of mosquito concerned is *Culex molestus*, and that it breeds continuously throughout the year, 100 feet below ground level. Breeding places are numerous, usually in the excavations below the lines and under platforms. In most cases the water is only a few inches deep but it is often 100 yards in length. Larvae were as numerous as in stagnant pools above ground during the summer. There was no artificial or natural lighting of these breeding places. In many parts of this underground system the temperature exceeds 70°F. when it is freezing above ground. Extermination of the pest should be easy if all the breeding places can be treated with cresol or paraffin. *Norman White.*

PATTERSON (T. C.). **Insect Pests in Northern Norway. The Mosquito Nuisance.**—*Jl. Roy. Nav. Med. Serv.* 1940. Oct. Vol. 26. No. 4. pp. 346–352.

In the far north, in the warmest months of the year, mosquitoes may be more abundant and cause more discomfort than anywhere in the tropics. In Northern Norway the seasonal peak of activity of the mosquito pest is in July. Physical and mental annoyance, pain and severe inflammatory lesions may be produced by mosquito bites. Mosquitoes in these regions do not usually fly about and bite at temperatures below 50°F., or above 70°F. Blood sucking propensities are said to be common to both female and male mosquitoes. The species of mosquito encountered were *Aëdes punctor*, *Aëdes communis*, *A. maculipennis* and various *Theobaldia*. Other than the mosquito the insect pests of Scandinavia include Tabanus, Chrysops, Culicoides and Simulium.

The author describes the measures to be taken to protect personnel exposed to attack by these voracious mosquitoes of the far north. Formulae are given for repellents that have been found useful: these mostly contain citronella oil. Special clothing, head nets and gauntlet gloves are recommended, as are, of course, measures to prevent the ingress of mosquitoes to living quarters. *N. W.*

ROY (D. N.) & GHOSH (S. M.). **On the Results of Forcible Feeding of Mosquitoes.**—*Jl. Malaria Inst. of India.* 1940. Sept. Vol. 3. Nos. 2 & 3. pp. 253–262. [12 refs.]

"(i) When mosquitoes were fed forcibly by the capillary tube method, inconsistent results were obtained, the food being found either in the stomach or in the oesophageal diverticula.

"(ii) Evidence of volitional control exercised by a mosquito over the choice of its food was noticed.

"(iii) When a mosquito is allowed to imbibe fluid food from wet cotton-wool, the destination to which the food is directed is extremely consistent, blood being invariably found in the stomach and water and sugary solutions in the diverticula.

"(iv) Blood ingested by a female mosquito by a bite is always detected first in the stomach.

"(v) When a mosquito is fed artificially with blood, egg formation takes place in *Aëd. aegypti* but not in *C. fatigans*; and it is suggested that the quantity of blood available for egg formation in *C. fatigans* falls short of the required minimum."

MCCAY (Frank) & WHITE (R. Senior). **Biological Control of *Culicine* Mosquitoes, by Prawns in a Bengal Coal Mine.**—*Indian Med. Gaz.* 1941. Jan. Vol. 76. No. 1. pp. 37–38.

In a coal mine in India, culicine mosquitoes were found to be breeding prolifically in pools near the coal face at a depth of about 1,000 feet. The mosquitoes had probably been introduced through the ventilation system, and the conditions of temperature and humidity were favourable for breeding and there was a plentiful supply of human blood. It was noticed, however, that certain pools contained prawns, identified as *Palaemon lamarrei*, and that in these pools the mosquito larvae were not so plentiful as in pools free from prawns.

It was found that the prawns were capable of devouring three *Culex fatigans* larvae each, *per diem*, and it was later found that those parts of the mine in which prawns were present had been cleared of mosquitoes. The consumption rate, for larvae, of these prawns is poor compared with that of Gambusia, but fish would probably not live under mine conditions. No anopheline larvae have been found in the mines. The prawns are probably introduced into the mines in sand used for stowing; they appear to afford a hopeful method of mosquito prevention and may even be useful in surface waters containing anopheline larvae, but this remains to be tried. *C. W.*

VARGAS (Luis). Clave para identificar algunos géneros de mosquitos americanos, utilizando los caracteres de los adultos. [**Key to the Adult Characters of American Mosquitoes.**]—*Rev. Inst. de Salubridad y Enfermedad. Trop.* Mexico. 1940. May. Vol. 1. No. 2. pp. 189–198. [10 refs.] English summary (7 lines).

UNTI (Ovidio). Anofelinos do Vale do Paraíba. Nota III. Biologia do *Anóféles* (*nyssorhynchus*) *strodei* Root, 1926 com a descrição d'uma variedade nova. *Anóféles* (*nyssorhynchus*) *strodei ramosi* var. N. [**Biology of** *A. strodei* **with a Description of a New Variety.**]—*Ann. Paulist. Med. e Cirurg.* 1940. Dec. Vol. 40. No. 6. pp. 489–505. With 1 fig. [11 refs.]

STRICKLAND (C.) & ROY (D. N.). **Experimental Intestinal Myiasis.**—*Indian Jl. Med. Res.* 1940. Oct. Vol. 28. No. 2. pp. 593–594.

In 1938, O. R. CAUSEY reported that as a result of experimental administration of larvae of *Lucilia sericata*, *Phormia regina*, *Calliphora erythrocephala*, *Sarcophaga securifera*, *Cochliomyia macellaria* and *Drosophila melanogaster* to dogs and cats, no larvae passed alive through the intestine [this *Bulletin*, 1939, Vol. 36, p. 505]. The authors having cognizance of Causey's work, report on similar experiments of their own carried out in 1931. First-stage larvae of *Musca vicina* were administered in large numbers to a rabbit; its health was unaffected and daily examinations of the faeces revealed no larvae. Next, a dog was fed with a "very large number" of first- and second-stage larvae of *Sarcophaga ruficornis* (mixed with the food). For two days it refused food, and passed liquid motions mixed with blood. The animal did not recover fully for a week, but at no time were larvae found in the stools. In a third experiment very many first and second-stage larvae of *Chrysomia megacephala* were introduced with milk into the stomach of a pup. It passed watery stools mixed with blood, showed some wasting and died on the ninth day. At autopsy, three intact adult *C. megacephala* were seen floating in a watery mucoid substance in the stomach, but no empty pupal case or larva was seen in the alimentary canal. Lastly, eggs of *C. megacephala*, three hours after oviposition, were given to a rabbit and to a dog, but they could not be detected in the faeces. In short, the aetiology of intestinal myiasis is still unsolved. *H. H. S.*

ROY (D. N.) & GANGULY (S. K.). **Linguatulid Infection in Man.**—*Indian Med. Gaz.* 1940. Aug. Vol. 75. No. 8. p. 478. With 1 fig.

This is believed to be the first record of linguatulid infection in man in the East.

The parasites were evacuated with coughing and sneezing by a woman whose chief symptom for some time had been pain over the frontal sinuses. She collected in all five specimens averaging 4·8 mm. long by 1·8 mm. at the widest point. In the text, 91 rows of spines are cited, only 32 can be traced on the figure. They were identified as nymphs of *Linguatula serrata* Frölich. The woman had had close association with dogs, the normal definitive hosts. *Clayton Lane.*

BÜCHERL (Wolfgang). Os Quilopodos do Brasil. [**The Chilopoda of Brazil.**]—*Mem. Inst. Butantan.* 1939. Vol. 13. pp. 49–362. With 72 figs.

WENRICH (D. H.). **The Morphology of Some Protozoan Parasites in Relation to Microtechnique.**—*Jl. Parasitology.* 1941. Feb. Vol. 27. No. 1. pp. 1–28. With 99 figs. on 4 plates. [29 refs.]

The author discusses the various techniques which he has employed during the past twenty years in the study of protozoa, chiefly the human intestinal parasites. Experience has led him to modify many of the standard procedures which are carefully described. He deplores the growing tendency to dispense with the examination of fixed and stained smears in making surveys of intestinal protozoal infections, for he has found that the examination of such preparations will give a larger percentage of positives than will the study of fresh smears in saline or iodine solutions. The paper is one which may well be studied carefully by those who undertake examinations for intestinal protozoa. *C. M. Wenyon.*

SABIN (Albert B.). **Toxoplasmic Encephalitis in Children.**—*Jl. Amer. Med. Assoc.* 1941. Mar. 1. Vol. 116. No. 9. pp. 801–807. With 8 figs. [20 refs.]

The paper gives a detailed description of two cases of atypical encephalitis, in boys six and eight years of age, in Cincinnati, U.S.A. One case terminated fatally thirty days after the onset and the other recovered after an illness of ten days' duration. Post mortem examination of the first case showed that the condition was a toxoplasmosis, the parasites being discovered in the brain and inoculated to mice. There was evidence that the second case was of the same nature, for two guineapigs became infected after inoculation of spinal fluid.

C. M. W.

PINKERTON (Henry) & HENDERSON (Richard G.). **Adult Toxoplasmosis: A Previously Unrecognized Disease Entity Simulating the Typhus-Spotted Fever Group.** *Jl. Amer. Med. Assoc.* 1941. Mar. 1. Vol. 116. No. 9. pp. 807–814. With 5 figs. [15 refs.]

The authors describe two fatal cases in adults of an acute febrile exanthematic disease occurring in St. Louis, U.S.A. The presence of toxoplasma in the tissues of both the cases left no doubt that these organisms were responsible for the condition, which in many respects, both clinically and pathologically, resembled Rocky Mountain spotted fever. Guineapigs and mice were readily infected by inoculation of blood or autopsy material. The observations recorded introduce a new factor of uncertainty in the differential diagnosis of acute exanthematic diseases of the typhus-spotted fever group.

C. M. W.

WOLFSON (Fruma). **Organisms described as Avian** *Toxoplasma.*—*Amer. Jl. Hyg.* 1940. Nov. Vol. 32. No. 3. Sect. C. pp. 88–99. With 4 figs. [49 refs.]

In discussing the parasites of birds which have been described as toxoplasms the author reviews the literature of the subject and points out that he himself has found in canaries parasites of three types, all of which appear to have been considered by observers as toxoplasms. The first of these consists of stages in the exoerythrocytic development of malarial parasites, the second is a parasite of undetermined nature within leucocytes and the third a true toxoplasm, resembling the toxoplasms of mammals, which are highly nonspecific and easily inoculable to a number of avian and mammalian hosts. The parasites of the second type cannot be inoculated to any other host—not even to one of the same species—and their method of reproduction is unknown. The various parasites described in the paper are illustrated by outline drawings. *C. M. W.*

NEGRONI (Pablo). Estudio micológico del primer caso sud-americano de histoplasmosis. [**Mycological Study of the First South American Case of Histoplasmosis.**]—*Rev. Inst. Bacteriológ.* Buenos Aires. 1940. June. Vol. 9. No. 3. pp. 239–294. With 15 figs. [29 refs.] English summary.

Working in Buenos Aires the author has isolated in culture *Histoplasma capsulatum* from a patient who died three months later. This is the first case of the disease to be described from S. America and the third from which cultures were obtained. The cultural characters of the fungus are described in detail. These vary considerably according to the media used. Microscopically filamentous mycelium, chlamydospores, proteiform cells budding by one of many poles, multiform filaments and typical blastospores are seen. Under certain conditions the cultures are yeast-like but these quickly change into the hyphomycetic growth. Laboratory animals are susceptible to inoculation of culture material. *C. M. W.*

JAMISON (S. Chaillé) & HOPKINS (Joe). **Bagassosis : a Fungus Disease of the Lung. A Case Report.**—*New Orleans Med. & Surg. Jl.* 1941. May. Vol. 93. No. 11. pp. 580–581. [Summary appears also in *Bulletin of Hygiene.*]

A negro labourer, 20 years of age, was admitted to hospital with fever, malaise, cough and dyspnoea of 12 days' duration. He worked in a sugar factory at the dusty occupation of unloading bagasse (bagace or bagass=cane trash); masks were used but did not keep out the dust. Symptoms suggested miliary tuberculosis, but no acid-fast bacilli could be found, the Widal reaction was negative to undulant fever, tularaemia and the enteric group. His fever ranged between 103·2° and 100°F., but became normal after 13 days. A culture was attempted with the sputum and there "grew a fungus" and again six days later the same growth was obtained. [Unfortunately the authors give no indication as to the identification of this fungus.]

H. H. S.

MOORE (Morris). **The Chorio-Allantoic Membrane of the Developing Chick as a Medium for the Cultivation and Histopathologic Study of Pathogenic Fungi.**—*Amer. Jl. Path.* 1941. Jan. Vol. 17. No. 1. pp. 103–120. With 29 figs. on 3 plates. [10 refs.]

The chorio-allantoic membrane of the developing chick has been used for the cultivation and study of viruses, rickettsiae and spirochaetes, but not, to any extent at least, for fungi.

For the work described by the author the method employed for virus cultivation was followed, the coverslip procedure in preference to the shell-flap method. Since fungi develop slowly it was found advisable to use eggs incubated, according to the type of organism, for 10 to 14 days. Yeast-like organisms were observed to develop in 5–7 days, filamentous forms took rather longer, 5–11 days, and, for them, eggs incubated for the shorter period of 10 days had to be used. The optimum temperature for incubation was 33°C. The eggs were examined daily and when growth was sufficiently advanced the shell was cut just below the surface of the chorio-allantois and removed. Zenker's fixative with 5 per cent. glacial acetic acid was dropped on the inoculated area to harden the membrane which was then removed and placed in Zenker's solution, then embedded in paraffin, sectioned and stained in the usual way.

The author thus cultivated and studied some 15 fungi, among them those of *tinea versicolor*, trichophytosis, *tinea cruris*, favus, moniliasis, blastomycosis, *Coccidioides immitis* and *Phialophora verrucosa* (chromomycosis). The general principle has been stated above, and there is no need to detail the characters of all those dealt with by the author, but one or two of special interest to readers of the *Bulletin* call for more remarks.

1. *Epidermophyton inguinale* (tinea cruris). Eggs of 13 days' incubation were used and observed for the next 8 days after inoculation. Macroscopically, the membrane was thickened and showed a confluent growth with aerial mycelium. The embryos were dead. Microscopically, the lesion was that of a " traumatic ulcer " with destruction of ectoderm and replacement with mesodermal inflammatory tissue. The mesoderm was markedly oedematous, with cellular proliferation and migration and many fibroblasts. The fungus growth consisted of spherical cells staining with eosin, and, scattered among these, were many leucocytes, monocytes and red corpuscles. Towards the periphery the spherical cells were fewer, and filaments more numerous staining with methylene blue and eosin.

2. *Coccidioides immitis*. For this eggs incubated for 13 days were used, as for the last. At the end of seven days the membrane was greyish yellow with thickening in patches which in places were confluent. The embryos in this case were not killed. Microscopically, the ectoderm in some parts was necrosed and invaded by leucocytes; the mesoderm showed focal leucocyte invasion and scattered leucocytes throughout; the endoderm was not apparently affected. The organism showed various stages of development with characteristic endosporulating cells of the parasitic stage, the filaments becoming arthrospores, then spherical cells which grew and developed endospores. Thus, in seven days the fungus had reverted to the parasitic rôle—a much shorter period than is usual in animals.

To epitomize: Macroscopically, the lesions showed as white, greyish-yellow or light brown plaques, discrete or confluent according to the

type of fungus. Microscopically, the reaction might be in the form of nodules, or ulcers, or hyperplasia, with infiltration of ectodermal cells, red corpuscles, fibroblasts and leucocytes and inflammatory changes with oedema. In most cases the fungus reverted to the parasitic morphology in 5 to 11 days.

"By this method it has been possible," says the author, "to develop lesions, some of which have hitherto required human subjects. The value of the chorio-allantois for this purpose may be emphasized also because the cost is much less than if experimental laboratory animals are used and the time necessary for the development of diagnostic features frequently is much shorter."

H. H. S.

FORD (Edward). **A Destructive Skin Disease of the Face in Natives of Papua and North Australia.**—*Med. Jl. Australia.* 1940. Dec. 21. 27th Year. Vol. 2. No. 25. pp. 668–669. With 1 fig.

Since BREINL's account of a peculiar affection of the skin of the face in inhabitants of Papua in 1915 [this *Bulletin*, 1915, Vol. 6, p. 132] we can find no further reference to it till this record by Dr. Ford. Nose, forehead, cheeks and upper lip may be affected, but extension beyond these parts is not observed.

"The active lesions consist of pustules containing sebaceous material which hardens to form a firm grey core. In some of these healing results in the formation of scarred, rounded pits, some of the more recent of which display a reddish-pink base which is readily noticeable by contrast with the surrounding brown skin surface. In the majority of patients seen relatively few pustules existed at the one time among the healed lesions, although in some they closely covered the nose. In the latter the nose was much enlarged and presented a peculiarly rugged appearance, from the presence both of raised active lesions and of interspersed scarred depressions.

"In an advanced case the affected area is closely pitted, and the surface acquires a glossy appearance from the presence of generalized scar tissue. The closely set depressions are often separated by hard, irregular ridges, which give to the region a finely ragged character.

"The destruction associated with the condition is due to the long-continued superimposition of fresh lesions on the affected area, each recurring crop scoring the surface more deeply. This irregular erosion leads to great disfigurement, which is most obvious about the tip of the nose and the margins of the *alae nasi*. The latter, in advanced cases, are often deeply and irregularly indented, as though nibbled away from the free border.

"The disease pursues a chronic course over many years, and finally heals spontaneously."

The disease has been seen not only in Papua but also in the D'Entrecasteaux group of islands, in Bathurst and Melville island, some 50 miles north of Darwin. In the D'Entrecasteaux islands about one case was seen in every thousand natives examined; in the neighbouring Trobriand Islands, none among 5,400 examined. It is known locally as *bila bila*. Owing to the disfigurement, it is thought by the relatives to be leprosy. Breinl reported instances in which the uvula and soft palate showed involvement, but the author has not seen any such. Staphylococcus was grown from 4 patients, *albus* in three, *aureus* in one. Unfortunately, no material was obtainable for histological examination. [Leishmania, spirochaetes, spirilla, and *Myco. tuberculosis*, are among the organisms which should be looked for.]

H. H. S.

MEINARDI-FLAUMENHAFT (T.). **Ecthyma gangraenosum s. cachecticorum s. terebrans.**—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1940. Oct. 1. Vol. 80. No. 40. pp. 2346–2349. With 3 figs. on 1 plate. English summary (3 lines).

This condition, rare though it is, says the author, has been observed by him in four patients during 1940. Three were children, aged 8, 11 and 18 months, and one a woman of 26 years. One child recovered, the other two and the woman died. The patients were not related. Description of one may serve for all. The child, aged 11 months, was anaemic and poorly nourished. On the flexor surfaces of both arms from elbow to wrist was an ulcerous condition with a greenish "diphtheroid" base, with considerable loss of tissue. At the edge were unpigmented scars. On the trunk extending from one nipple to the other was a deep ulcerous patch, some 4 cm. broad, parallel with the arch of the ribs, covered with a dry, greenish necrotic mass. Between the umbilicus and the lowest ribs was an ulcer "the size of a rijksdaalder" with a sanguineo-purulent base and haemorrhagic border. Culture grew only *Staph. Aureus.* The condition of this child is well shown in a photograph.

[Naturally, the diagnosis has to be made from congenital syphilitic ecthyma in the children, but the Wassermann reaction was not carried out with their sera; that of the woman was strongly positive, but she died in spite of having received antisyphilitic treatment.]

H. H. S.

MARTIN (J. T.) & HESTER (K. H. C.). **Dermatitis caused by Insecticidal Pyrethrum Flowers** (*Chrysanthemum cinerariifolium*).—Reprinted from *Brit. Jl. Dermat. & Syph.* 1941. May. Vol. 53. pp. 127–142. [12 refs.]

The authors have made an experimental study of the dermatitis which is caused by the flowers of *Pyrethrum*, an insecticidal plant. They conclude that the essential insecticidal substances, the pyrethrins, are not responsible for the irritation, some or all of which is produced by a volatile oil.

Products containing extract of *Pyrethrum* are widely used as domestic insecticides and occasionally in the treatment of scabies. In general they are inoffensive to man, but individuals occasionally become highly sensitized and then suffer from dermatitis and general allergic symptoms. This sensitization is particularly troublesome among those who grow the plant as a crop, for instance in Kenya. It is not known which of the numerous substances present in extracts is responsible for the symptoms. The question is important in view of the great value of pyrethrum extracts as insecticides.

One of the present authors is a chemist who has become sensitive in the course of about ten years work on *Pyrethrum*: he allowed himself to be made the subject of the experiments here described. The general method used has been to test parts of powdered flowers and fractions of extract, which are applied to a piece of flannel strapped to the skin: twenty-four hours later the subject is examined for evidence of reaction. The authors find that the pollen of *Pyrethrum* only produces a slight erythema: this is an interesting result, for it has been held that pollen is one of the principal sources of irritation, and that its carriage by wind explains the fact that sensitive people

are affected when they are some distance from growing plants. Further experiments showed that the irritating material resides in the lower portion of the flower head.

The investigators then made extracts and fractionated them in various ways. They were able to show that the pyrethrins (which are the active insecticidal agents) are not responsible for the dermatitis, even if concentrated solutions are used. This is important, for it means that one should be able to prepare extracts which are active against insects and innocuous to man. After other constituents had been ruled out, it was found that the volatile oil free from acids caused a very intense reaction on the patient: the possibility that other irritating constituents exist in the plants was not altogether excluded.

During the course of the experiments an undue number of patch tests were carried out on one day. Several of the patches became exceedingly irritating and then the experimenter's face smarted and became puffy. This was followed by persistent faintness and shivering and necessitated his going to bed. Recovery was not complete until three days later. Apart from this observation it may be said that the authors tended to confine their attention to the local dermatitis; on that subject they have added greatly to what is known.

P. A. Buxton.

FREUND (R.) & SAMUELSON (S.). **Transitory Infiltration of the Lung with Eosinophilia. Löffler's Syndrome.**—*Arch. Intern. Med.* 1940. Dec. Vol. 66. No. 6. pp. 1215–1220. With 1 fig. [11 refs.] [Summary appears also in *Bulletin of Hygiene.*]

It is important to recognize the condition known as Löffler's syndrome because the clinical findings and the X-ray appearances are similar to those of pulmonary tuberculosis and, in fact, it has been thus wrongly diagnosed.

The cardinal signs of Löffler's syndrome are: Signs of pulmonary disease revealed by percussion and auscultation, X-ray shadows, transience of pulmonary signs and eosinophilia in the peripheral blood. The authors state that 105 cases have been reported—they give a table of 104, their own would make the total correct—of which Löffler himself has reported 51. Of the total, 82 were adults, 23 were children. The present case occurred in Palestine in a woman of 25 years. For six years she had been subject to respiratory catarrh and asthma (but no allergy could be determined). When seen, her temperature was 100°F., and she had pain in the left side on coughing, an enlarged gland over the middle of the left clavicle, painful to the touch; below the left clavicle and posteriorly over a corresponding area, the size of the palm, was decreased resonance, diminished breath sounds, with surrounding bronchial breathing, and a few fine crepitations. No asthma. The diagnosis was infiltration in the upper lobe of the left lung, perhaps tuberculous (but no bacilli were seen). Next day, X-ray showed infiltration in the middle field of the left lung. Eight days later there developed suddenly diffuse bronchitis with moist râles over both lungs, but no rise of temperature and no further X-ray signs. Two days later the bronchitis was clearing, and in three days more the patient left feeling well and the X-rays revealed all clear. Eosinophils on entry were 22 per cent. and thereafter varied between 12 and 21, till two days after she went out to work again, when it was 8·5 per cent.

The cause is not known; ENGEL in China [*Bull. of Hyg.*, 1936, Vol. 11, p. 296] and KOINO in Japan ascribe it to allergic states, *e.g.*, blossoming of privet, but this has not been observed in Europe. In some respects it resembles coccidioidomycosis [see this *Bulletin*, 1939, Vol. 36, pp. 507–508; 1940, Vol. 37, p. 882]. Allergy, it is generally agreed, does play a part in the pathogenesis, but what is the source and what part it plays have yet to be discovered. *H. H. S.*

FRIMODT-MÖLLER (C.) & BARTON (R. M.). **A Pseudo-Tuberculous Condition associated with Eosinophilia.**—*Indian Med. Gaz.* 1940. Oct. Vol. 75. No. 10. pp. 607–613. With 7 figs. on 2 plates. [Summary appears also in *Bulletin of Hygiene.*]

The authors describe a condition, which they have seen frequently at the Union Mission Tuberculosis Sanatorium, Arogyavaram, S. India, of eosinophilia associated with characteristic X-ray appearances, which differs from Loeffler's syndrome in that it is not transient, which has no apparent connexion with tuberculosis, syphilis or heart disease, and which is probably not caused by helminthic infection. The authors believe the condition to be allergic in origin but are by no means dogmatic in their opinion.

Of the 175 patients studied, 106 had more than 5,000 eosinophils per cmm. of blood on admission; in some the relative count was as high as 90 per cent. or more. In the remainder the eosinophils were not so numerous but were usually well above the normal level.

The X-ray appearances are characterized by "extensive mottling over both lung fields, usually evenly distributed; the size of the shadows is about 2 mm. and there is usually a certain amount of increased striation . . . . The general appearance is something similar to miliary tuberculosis or to silicosis." In none of the patients, however, were the X-ray appearances typical of tuberculous infiltration. The symptoms are fever, cough, sputum, loss of weight, chest pain and sometimes haemoptysis. Physical signs sometimes indicate tuberculosis but very few of the 175 patients seen had tubercle bacilli in the sputum, and the majority were negative to tuberculin. Furthermore, the prognosis is good; in some patients, followed for several years, the condition has remained unchanged.

In discussion the authors consider pneumoconiosis as a possible cause of the condition, but find little evidence to support this view. Changes in the lungs might be produced by infection with Ascaris or hookworm, but if this were the cause, the eosinophilia (usually an acute reaction of allergic type) would probably disappear even if the lung changes remained. The patients have been observed over periods of several months when it was unlikely that reinfection of any size either with Ascaris or hookworm could take place, yet the X-ray and eosinophilia remained unchanged. Typical asthma was not a feature of this disease. It is possible that several factors are concerned.

C. W.

FRIMODT-MÖLLER (C.). **A Scheme of Control of Tuberculosis in India by "Organized" Home Treatment.**—*Indian Med. Gaz.* 1940. Oct. Vol. 75. No. 10. pp. 577–581. [Summary appears also in *Bulletin of Hygiene.*]

The author points out the great dissimilarity between conditions in India and those in Europe in regard to the existence of facilities for

controlling tuberculosis, and shows that there is no possibility of the early provision of institutions on such a scale as to be capable of receiving the mass of tuberculous persons (estimated by some as 2 millions, by others as many as 5 millions). The scheme which he puts forward he calls "organized home treatment," the aim of which is to apply as much as possible of modern specialized treatment and prevention to the patients and contacts in their homes. Though institutions cannot cope with the whole problem, it is necessary that as many as possible be formed as the basis from which modern methods can be carried into the homes. The tuberculosis clinic is therefore essential and should be instituted in every large city. At this clinic artificial pneumothorax treatment should be given. Hospital wards and sanatoria should be provided wherever possible, since surgical collapse of the lungs will be needed.

Facilities for training of medical men and the ancillary services would exist in these institutions, and the author emphasizes the importance of collaboration between specialist staffs and general practitioners. After-care is necessary and the provision of colonies will eventually be needed. Education of the sick, the relatives and of the general population must be provided for.

[The paper is written in general terms but the reasoning is sound and the plan perfectly feasible.] *C. W.*

BERMAN (Charles). **The Clinical Features of Primary Carcinoma of the Liver in the Bantu Races of South Africa.**—*South African Jl. Med. Sci.* 1940. Oct. Vol. 5. No. 4. pp. 92–109. With 5 figs. [58 refs.]

"The clinical manifestations of 66 Bantu cases of primary carcinoma of the liver are presented.

"On symptomatological grounds these cases have been classified into five clinical groups:—(i) 'frank' cancer (63·6 per cent.); (ii) 'acute abdominal' cancer (9·1 per cent.); (iii) 'febrile' cancer (7·6 per cent.); (iv) 'occult' cancer (15·1 per cent.); (v) 'metastatic' cancer (4·6 per cent.).

"In 'frank' cancer the signs and symptoms were referred to the liver from the onset in patients who were previously in good health. The mode of onset was gradual. The symptoms were: asthenia, 86 per cent. of cases; abdominal pain, 90 per cent.; dyspnoea, 26 per cent. The physical signs were: loss of weight and emaciation, 81 per cent.; enlargement of the liver, 100 per cent.; tenderness of the liver, 90 per cent.; jaundice, 43 per cent.; ascites, 55 per cent.; dilatation of the superficial abdominal veins, 19 per cent.; oedema, 29 per cent.; and haematemesis in one case. Secondary anaemia was a frequent feature.

"In 'acute abdominal' cancer the patients were unaware of their condition, but suddenly developed acute surgical conditions of the abdomen due to rupture of carcinomatous nodules or erosion of blood vessels on the free margin of the liver. The mortality was high. Those cases which survived operation later developed the clinical picture of 'typical' primary liver cancer.

"The 'febrile' group (the most rapidly growing form of primary liver cancer) displayed symptoms not unlike those of amoebic liver abscess.

"The cases of 'occult' cancer were usually discovered either during routine examination for complaints other than those attributable to disease of the liver, or accidentally at autopsy.

"Three instances of 'metastatic' cancer are described: these were due to secondary deposits in the lungs, the ribs and the brain. In all these cases symptoms due to metastases completely overshadowed the primary lesion in the liver.

"The prognosis was hopeless and the duration of the disease never longer than four months. The average length of stay in hospital was 18·2 days; the most rapidly fatal cases occurred in Groups II and III.

"The treatment was purely palliative. Surgical intervention was always impracticable."

CHIN (Suiin). Ueber die Tribouletsche Reaktion im Kot der Darmtyphuskranken. [**The Triboulet Reaction in the Stools of Typhoid Patients.**]—*Taiwan Igakkai Zassi* (*Jl. Med. Assoc. Formosa*). 1940. Oct. Vol. 39. No. 10. [In Japanese pp. 1625–1631. [12 refs.] German summary p. 1632.] [Summary appears also in *Bulletin of Hygiene.*]

[This journal—and it is not the only one—has an annoying habit of using special names for tests or reactions without defining the reaction in question. The reviewer cannot find any reference to or description of the Triboulet reaction in the literature, but as laboratory workers may know to what it refers this paper is abstracted here. In the very next article in this journal the author speaks of the Heilmeyer-Krebs method, and earlier of Wakeshima's egg-counting method, in neither case giving any definition.]

Apparently Triboulet's reaction is one which gives positive results in typhoid fever, increasing till the acme of the disease is reached, about 3–4 weeks, and then declining to a negative by the eighth week. The following percentage figures are given for successive weeks from the first to the eighth: 66·6, 86·2, 90·0, 85·7, 47·8, 25·0, 12·5 and 0. The reaction is a faecal one and seems to go *pari passu* with the pathological changes in the bowel.

The author states that he tried it in 29 patients and found it positive in all, whether mild or severe; in relapses it was invariably negative. In 14 of the 29 the reaction was evident in 5 hours; four of these fourteen died, four ran a severe course, the other six an average course. It is argued that if the reaction is given within the 5-hour period the course is likely to be severe and perhaps end fatally. It is, therefore, of some prognostic as well as diagnostic value. *H. H. S.*

RAO (R. Sanjiva) & GANAPATHI (K.). **Sulphathiazole in Some Experimental Bacterial and Virus Infections.**—*Indian Med. Gaz.* 1941. Feb. Vol. 76. No. 2. pp. 78–81. [16 refs.]

The infections which formed the subject of this test were those of *Bact. typhosum*, *V. cholerae*, fixed rabies virus and vaccinia virus, while the drugs employed were sulphanilamide, sulphapyridine and sulphathiazole. Mice were used as the test animals except in the case of vaccinia virus where rabbits were employed. The virulence of both *Bact. typhosum* and *V. cholerae* was raised before the testing experiment

was begun by serial injection, and young mice were used. Out of groups of 16 mice, allotted to sulphanilamide, sulphapyridine, sulphathiazole and control experiments for *Bact. typhosum*, with administration of the drug by glass pipette into the stomach, 12, 11, 11 and 0 animals respectively survived, so that all the types of drug showed very similar therapeutic effect and there were no survivors among the controls. No therapeutic value of any kind was found for *V. cholerae*, fixed rabies virus infection and vaccinia virus infection.

W. F. Harvey.

CASTANEDA (M. Ruiz) & CARDENAS (Clemente Carrillo). **Treatment of Brucellosis with Brucella Antigens.**—*Amer. Jl. Trop. Med.* 1941. Mar. Vol. 21. No. 2. pp. 185–190.

Based upon a study of 35 patients with brucellosis, in 20 of whom *Br. melitensis* was isolated, this paper is devoted mainly to treatment by antigens prepared from the organism. In the remaining 15 cases diagnosis was based upon clinical findings aided by agglutination and allergic tests. Three clinical groups were distinguished; four were mild, twenty-five more severe and six gravely ill. Specific treatment was based upon a combined method of immunization and desensitization by means of antigens prepared from *Br. melitensis*, *Br. abortus* and *Br. suis* grown in Kolle flasks on liver-agar for 48 hours. The preparation in which the main points are trituration of the growth and centrifugation at high speed is described in detail. Eventually the supernatant fluid is titrated for its nitrogen content and diluted with formalized saline to contain 4·27 per cent.

The antigen, now termed M.B.P. (according to the three types of Brucella), was standardized by testing it on the skin of normal persons and patients; by further dilution the standard was attained which caused definite allergic reactions in patients, but none in normal persons.

Treatment is commenced by intradermal injection of 0·2 cc. Subsequently injections are given twice weekly subcutaneously with gradually increasing doses to 2·5 cc. The injections are well-tolerated provided the reactivity of the patient is studied and none given if the temperature is over 40°C. In addition blood transfusion, liver extract and vitamins B and C have been administered, and in a few instances sulphanilamide and sulphapyridine were added.

In the mild cases improvement commenced 9, 12 and 45 days after the beginning of treatment, and continued for 29, 37, 51 and 105 days respectively. In the severe cases (25 in number) recovery began 3 to 60 days after institution of treatment; which was continued from 1 to 4 months. The six patients who were gravely ill reacted in a relatively short time. The period of observation, however, continued from 2½ to 7 months. In two cases treated with serum, serotherapy was followed by sufficient clinical improvement to warrant resumption of antigen therapy.

P. Manson-Bahr.

MARU (A. M.). **Some Minor Surgical Conditions treated with Cod Liver Oil.**—*Med. Bull.* Bombay. 1940. Sept. 21. Vol. 8. No. 18. pp. 594–595.

The author advocates the use of cod liver oil as a dressing, after cleaning up the affected area with eusol or spirit. The oil is boiled

before use and is applied on gauze ; boiling does not apparently reduce its efficacy. The method is cheap and effective in promoting granulations. He quotes cases of septic sinus, cellulitis, eczematous ulcer of the ankle, lacerated wound and extensive scalding of the anus, all treated successfully by this method. *C. W.*

COULSTON (Frederick). **The Use of Diaphane for Mounting Giemsa Type Preparations.**—*Jl. Lab. & Clin. Med.* 1941. Feb. Vol. 26. No. 5. pp. 869–873. [14 refs.]

It is well known that tissues stained with the Romanowsky stains lose their colour fairly rapidly on being mounted in balsam. Euparal and a similar preparation, diaphane, have been recommended for mounting purposes, and the author gives complete instructions for the methods of using these after dehydrating procedures involving the use of alcohol-acetone or of dioxane. Details of staining and dehydration are described. The conclusion is that diaphane or euparal can be confidently recommended ; for the technical details the original must be consulted. *C. W.*

SAPRE (S. N.). **A Technique for cutting Serial Sections of Chitinous Objects.** —*Indian Jl. Vet. Sci. & Animal Husbandry.* 1939. Dec. Vol. 9. Pt. 4. pp. 411–413. With 1 fig.

FAN (Ch'uan) & CH'EN (Wu-min). **Variations in the Composition of Soybean "Milk."**—*Chinese Med. Jl.* 1940. Oct. Vol. 58. No. 4. pp. 479–482.

Soybean milk is much used in oriental dietaries and the authors have attempted to determine its composition in order to study the factors which might influence it. Having obtained a supply of beans sufficient for the whole experiment, they prepared the milk by a standard basic process, but modified the various procedures from sample to sample in order to determine the effects of these modifications on the resulting product. The results show that even with strict supervision the composition of the milk made with the same procedure is not constant. The specific gravity, fat and nitrogen content may vary independently and significantly within a wide range.

It is difficult, therefore, to draw conclusions, but it is safe to say that in any experiment on metabolic balance it is unwise to assume that daily specimens made by the same process are equal. With a proportion of bean to water fixed at 1 to 8 it is difficult to obtain a protein content as high as 4 per cent. *C. W.*

MOTTOULLE (Léopold). **Medical Aspects of the Protection of Indigenous Workers in Colonies.**—*Internat. Labour Rev.* 1940. Apr. Vol. 41. No. 4. pp. 361–370. [Summary appears also in *Bulletin of Hygiene.*]

This is a paper written in general terms, but it gives an admirable account of the principles of the modern enlightened treatment of native labourers. It is pointed out that it is the duty of Government to instruct employers and employed as to the measures to be taken

to protect health, and that protection cannot be considered adequate unless account is taken of the moral and social well-being of the workers and their families. Labourers come from places with widely differing environments, and are generally unused to the kind of work they go to perform ; it is therefore usually necessary to institute a period of training, or of acclimatization, before entering on full labour.

The principle of voluntary labour is now generally accepted, and it is realized that compulsion of any kind is harmful to the health and output of the labourer. Employers would be wise to attempt, in allotting tasks, to take into account the tastes and preferences of the workers.

Recruitment should be subject to medical examination, but in the absence of a doctor recourse may be made to recognized indices of physical strength, though these should be corrected by imposing a minimum weight, below which a worker should not be considered fit for industrial employment ; in the Belgian Congo this minimum weight is fixed at 50 kgm. (110 lb.). Diseases which definitely debar a man from being employed should be laid down by Government, as should those which debar from heavy, but not from light, work. Control of employment of women and children must be strict ; women should not be employed during pregnancy or while nursing their children, and no child under 16 should be employed. It is important to encourage men to bring their wives and families to their place of work. Morbidity and even mortality rates are much higher in unmarried men than in married labourers accompanied by their families, and the latter form more stable labour communities.

Clothing and food supply must be adequate, and new arrivals should be treated for any parasitic diseases and should be vaccinated against the diseases prevalent in the area. The period of initiation into industrial employment is the most dangerous to health [and it may also be pointed out that sometimes recruits arrive in bad condition due to the fatigues of the journey and to illness ; a period of acclimatization, with good food and medical attention is therefore often absolutely necessary].

The author gives a list of the social institutions established by the Mining Union of the Upper Katanga, these are too numerous to be set out in detail here, but mention may be made of the organization of tribal assemblies to keep the workers in touch with the communities from which they came. *C. W.*

LEE (Douglas H. K.). **A Basis for the Study of Man's Reaction to Tropical Climates.**—*Univ. of Queensland. Papers. Dept. of Physiology.* 1940. Dec. 30. Vol. 1. No. 5. 86 pp. With 20 figs. [350 refs.] [8s.]

Medical physiologists in Australia have for many years taken a deep interest in the problems of human residence in the tropical parts of their continent. At the Institute of Tropical Medicine at Townsville (since 1929 incorporated in the School of Public Health and Tropical Medicine in Sydney) A. BREINL and W. J. YOUNG and their colleagues [this *Bulletin*, 1920, Vol. 15, pp. 284, 298 ; 1921, Vol. 18, p. 269] carried out a considerable number of investigations on the physiological effects of hot climates. They and other Australian writers, notably CILENTO [*Bull. of Hyg.*, 1926., Vol. 1, p. 667] and

more recently A. Grenfell PRICE [*Med. Jl. Australia*, 1935, Vol. 1, pp. 106–110], have at different times marshalled the available facts in an attempt to answer some of the practical questions of white settlement in the tropics. For the most part they have had to conclude that a great deal more research was required; yet they were able to pronounce on the value of large tracts of land for human habitation and also to point out deficiencies in various social and economic conditions, *e.g.*, in housing, as suggested by physiological considerations.

Prof. Lee of the new School of Physiology in the University of Queensland has recently begun to follow up these pointers of his predecessors as part of a comprehensive programme of research into tropical settlement (Fourth Report of the National Health and Medical Research Council of Australia; The Settlement of Tropical Australia, *Med. Jl. Australia*, 1936, Vol. 2, p. 707). He is concerned as much with the study in the laboratory of the basic physiological effects of heat as with observations in the field and with the detailed application of these studies to the practice of tropical hygiene.

His present publication is practically a monograph on the whole subject of human existence in hot surroundings. In so wide a subject, with so much of the literature in a chaotic condition, this paper will be valued for introducing a good measure of clearly-conceived co-ordination. While a detailed criticism cannot be undertaken here it is worth taking note of one of the basic standpoints Lee has adopted.

In welcome contrast to many writers on this subject, he has not indulged in a mere systematized cataloguing of myriad "reactions to heat." He has in the first place specifically discriminated those reactions which may be truly regarded as *adaptations* to the climatic thermal conditions. The particular processes so differentiated find considerable justification in the available evidence of evolutionary and homoeostatic physiology. Thus the changes at the skin surface—vasodilatation, rise in temperature, sweating—in the respiration, in water metabolism, in the endocrine, circulatory, excretory and other systems of the body, all these can be shown by experiment to be causally interlinked in the homoeothermic adjustments.

As a consequence of this approach, the general nature of permanent adaptation, *viz.*, acclimatization and of maladjustment can be placed on a rational basis. The clinical pictures of heat disorders (heat stroke, heat exhaustion, heat cramps and dehydration) can be recognized in essentials as the pathological counterparts of a fairly definite, though elaborate physiological integration. In doing this, Prof. Lee has also been able to cover a large number of the isolated observations sprinkled over a great variety of journals (350 references are quoted).

But it must be admitted that the author has not entirely escaped the difficulties of this approach. Among the adaptive processes he lists as a "secondary adaptation" a rise in body temperature. It is true that a small degree of pyrexia will make for an increased loss of heat, tending to stabilization—a definitely "normal" reaction as we know in the case of muscular exercise. But if the rate of temperature rise is fast and great enough the pyrexia clearly no longer fulfils this rôle. It becomes at once a sign of the failure of adaptation and (very probably) the essential agent in the pathogenesis of heat-stroke. The significance of a rise of body temperature needs very careful interpretation, particularly as regards its associated physiological involvements. To maintain that this reaction to heat is an important adaptation seems

undesirable; it will tend to obscure the essential rôle of pyrexia where it is most significant, that is, in maladjustment.

A lesser criticism concerns the differentiation of "secondary" from "primary" adaptations. One would hesitate to say categorically that some of these processes do not come into operation in hot surroundings from the very beginning of exposure to heat. But this objection will no doubt be met as more precise results accumulate.

The wide field which Prof. Lee has surveyed has only allowed the mentioning of the bare essentials of some important topics. This is so in regard to the pathology of heat-stroke, a subject which admittedly abounds with many vague and ill-supported theories. One can sympathise also with what he writes concerning the physiology of acclimatization "... a good deal more must be achieved in examining, measuring and tabulating the facts of acclimatisation first, before any serious attempt can be made to understand its mechanism."

In his discussion of the hygiene of tropical residence the author comes to the practical applications of physiological facts and principles. Under the heading "Assessment of Climate" he reviews the different indices which have been proposed for judging (usually) the thermal comfort of the environment. Here he reiterates the findings of a recent paper on the evaluation of climatic regions of Queensland, in which he considers "effective temperature" the most useful index. [See this *Bulletin*, 1940, Vol 37, p. 879.] In his comments on the possibility of selecting individuals for settlement in very severe tropical conditions, no mention is made of the pioneer work of DREOSTI [this *Bulletin*, 1935, Vol. 32, p. 494; *Bull. of Hyg.*, 1936, Vol. 11, p. 747; 1937, Vol. 12, p. 694,] on the Witwatersrand, whose work has had valuable results in practice.

Concerning "Protection against Heat Elements" the author deals with clothing, house construction, air-conditioning, personal and domestic habits. While this section is only dealt with summarily several rather surprising omissions must be mentioned. The use of heat-reflective metal foil in headgear and in housing is a development which seems to have been overlooked. In practice aluminium foil has in the last few years found extensive use for dealing with radiant heat. The discussion on air-conditioning might well have included a mention of the "unit" air-conditioning plants which make the provision of cooling in hot climates of widespread practicability. These units have been on the market for some years and have given satisfaction in the tropics [*Bull. of Hyg.*, 1938, Vol. 13, p. 161; 1939, Vol. 14, p. 261].

Professor Lee's discussion of personal and domestic habits in the tropics, based as it is on the nature of the bodily adaptations called into play, is an admirable essay in applied physiology. It is a pity that the recent article by MARSH in the British Encyclopaedia of Medical Practice [*Bull. of Hyg.*, 1938, Vol. 13, p. 645] has escaped attention. This very practical article would well supplement Professor Lee's able discussion. *J. S. Weiner.*

LEE (Douglas H. K.) & BOISSARD (G. P. B.). **The Effect of Exercise in Hot Atmospheres upon the Pulse Rate.**—*Med. Jl. Australia.* 1940. Dec. 21. 27th Year. Vol. 2. No. 25. pp. 664–668. With 4 figs.

Seven healthy male subjects carried out standard exercise in hot dry conditions (D.B. 101°F., W.B. 79°F.) and in hot moist conditions

(D.B. 87·5°F., W.B. 83·5°F.). When water loss was fully replaced the pulse rate was observed to rise to a higher level as a result of exercise (either walking or weight lifting) in the afternoon than in the morning. The level of water intake is more important in the hot dry than in the hot moist conditions; in the former replacement of half the water lost produces a marked improvement in reaction, although administration of double this amount is no more effective. In hot moist conditions replacement of half the water lost causes a slight improvement. Saline solution instead of water seems to be a disadvantage in hot dry atmospheres, but it causes some improvement in hot moist conditions. When ample water is given there is no difference between the effects of the two atmospheres, but when water is withheld the pulse rate is raised much more by exercise in hot dry conditions. Acclimatization, under the conditions of these experiments, has only a minor effect in hot moist atmospheres, but it may play a significant rôle in hot dry atmospheres. *E. M. Killick.*

CLARK (Alfred). **Effects arising from Inhibition of Cellular Activities. No. 3—Selenium.**—*Jl. Trop. Med. & Hyg.* 1940. Oct. 15. Vol. 43. No. 20. pp. 250–252. [10 refs.]

REVIEWS AND NOTICES.

ZANZIBAR PROTECTORATE. **Colonial Development Fund (Malaria Research Scheme). Report of the Zanzibar Research Unit June 1934 to September 1937** [McCARTHY (D. D.), M.B., Ch.B. (N.Z.), D.T.M. & H. (Eng.)].—pp. ii+141. With 2 maps, 56 figs. & 2 plates. [Bibliography.] 1941. Zanzibar: Govt. Printer. [5s.]

This is a well documented report of a comprehensive malaria survey of the Zanzibar Protectorate. The survey was carried out in two stages. Fifteen months were devoted mainly to a study of malaria in the municipal area of Zanzibar. A subsequent year was devoted to the study of malaria in rural areas of Zanzibar Island and in areas around the three chief townships of Pemba Island. Considerable space is devoted to a description of the history, geology, topography and meteorology of the Protectorate, of the variety of races that constitute its population, of land tenure and ownership, and crops and food. The description is interesting but some of the matters dealt with have but little bearing on malaria and its problems. On the other hand one finds but very scant reference to causes of morbidity or mortality other than malaria. This is characteristic of many malaria survey reports. One sometimes regrets that malariology is so exclusive, or rather so independent, a branch of public health science.

Malaria is hyperendemic in the Protectorate. As in most countries of high endemicity it is difficult to measure the baneful effect of its prevalence on the well-being of the population. The splenic index is from 60 to 80 per cent. Malaria is directly responsible for the deaths of some 1,200 persons a year; the population of the Protectorate is about 220,000. It appears that the total deaths from all causes exceed the number of births, but figures are not given.

Two species of Anopheles are responsible for the transmission of malaria, *A. gambiae* and *A. funestus*: the former is the more potent vector: *A. funestus* is not found far from rivers or streams. Exacerbations in the severity of malaria have been noted about every ten years. *P. falciparum* is the predominant species of parasite. *P. vivax* is very prevalent only in years of particularly active transmission.

The report should be of great value to the Public Health administration of the Protectorate. *Norman White.*

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BULLETIN OF WAR MEDICINE.

The attention of readers of the *Tropical Diseases Bulletin* is drawn to a new publication entitled the *Bulletin of War Medicine*, issued by the Medical Research Council, edited and prepared by the staff of the Bureau of Hygiene and Tropical Diseases, and published by H.M. Stationery Office.

A perusal of the subjects dealt with will indicate its wide scope. These are shown in the accompanying table:

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XI. Venereal Diseases.
XII. War Gases and Explosives.
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XV. Aviation Medicine.
XVI. Industrial Hygiene.
XVII. Food and Drink.
XVIII. General Sanitation.
XIX. Civil Evacuation.
XX. Public Health Administration and Organization.
XXI. Recruits and Pensions.
XXII. Physiology.
XXIII. Bacteriology and Immunity.
XXIV. Miscellaneous.
XXV. Book Reviews.

Some of these are of interest and importance to officers of the Colonial Medical Service in their routine work and practice, such, for example, as the general consideration of wounds, their pathology and treatment, the varieties, causes and treatment of shock, modern developments in anaesthetics and their administration, blood storage and transfusion and venereal diseases. In the event of the war spreading further to tropical countries and the Colonies, the other subjects dealt with and mentioned above will assume increased importance.

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